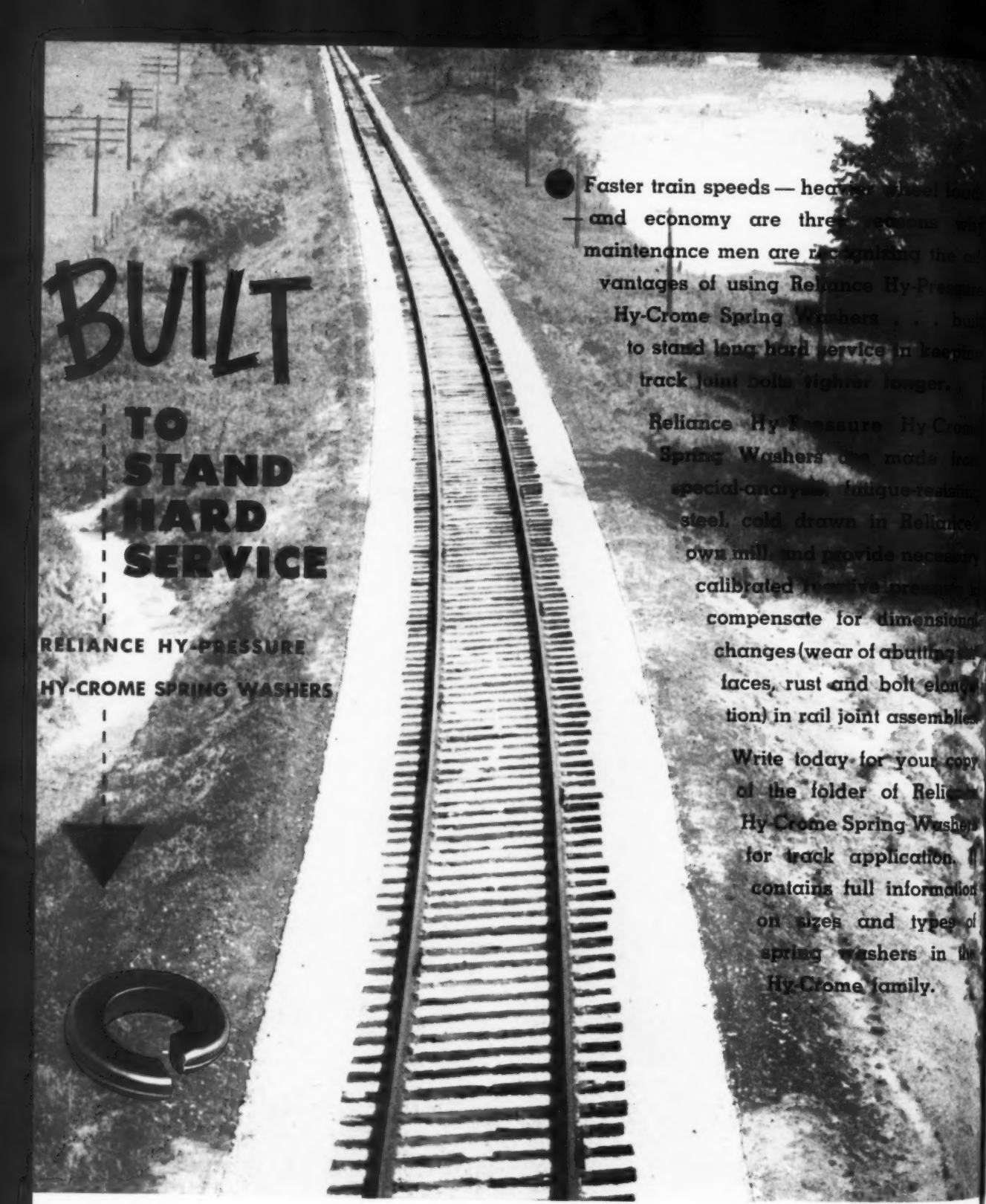
MAY, 1947

Railway Engineering and Maintenance



Faster train speeds — heavier wheel loads — and economy are three reasons why maintenance men are recognizing the advantages of using Reliance Hy-Pressure Hy-Crome Spring Washers . . . built to stand long hard service in keeping track joint bolts tighter longer.

Reliance Hy-Pressure Hy-Crome Spring Washers are made from special-analysis, fatigue-resisting steel, cold drawn in Reliance's own mill, and provide necessary calibrated resistive pressure to compensate for dimensional changes (wear of abutting surfaces, rust and bolt elongation) in rail joint assemblies.

Write today for your copy of the folder of Reliance Hy-Crome Spring Washers for track application. It contains full information on sizes and types of spring washers in the Hy-Crome family.

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EATON MANUFACTURING COMPANY

Reliance HY-PRESSURE HY-CROME *spring washers*

RELIANCE DIVISION
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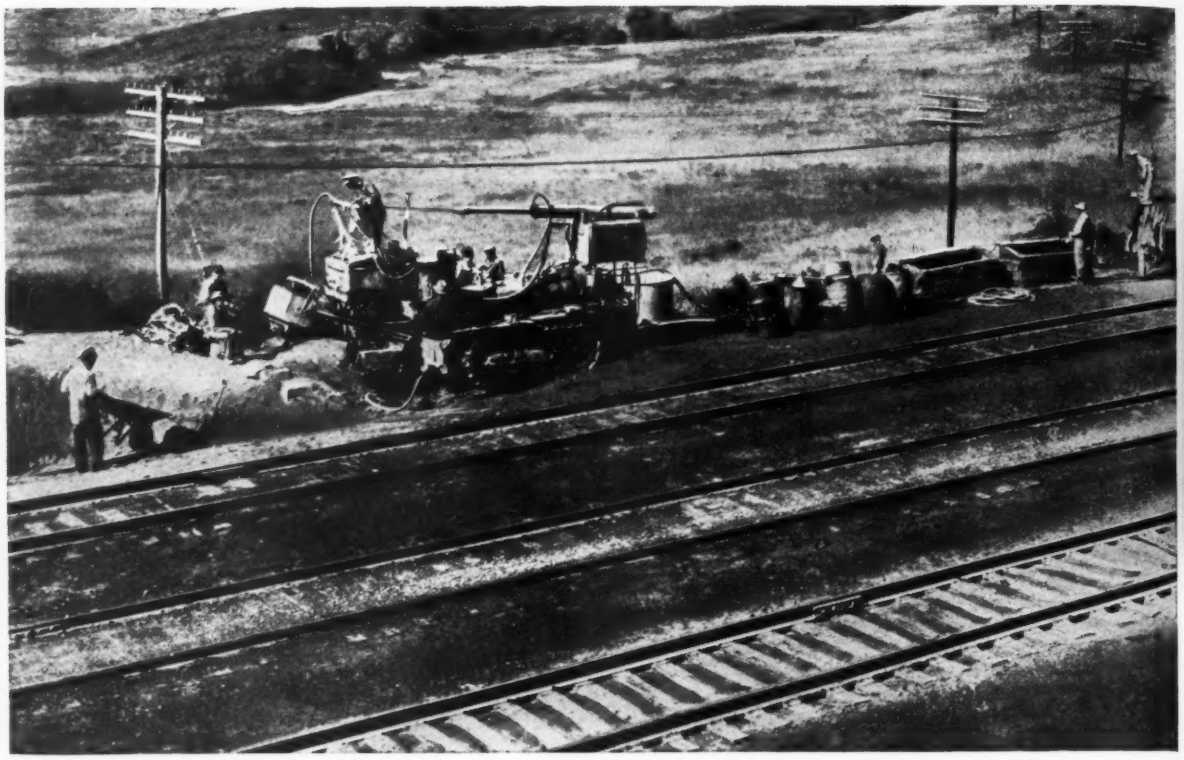
Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.



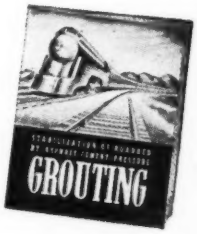
Stabilize Roadbed BETTER... FASTER...CHEAPER

DANGEROUS "soft track" can be eliminated very simply and inexpensively by asphalt-cement pressure grouting — using *Texaco No. 24 Emulsified Asphalt* in the mixture.

Texaco No. 24 Emulsified Asphalt was developed especially for grouting and has many advantages over standard emulsified asphalt. It helps the grout flow more freely, penetrate more thoroughly, and seal better and faster. It also permits use of leaner, more economical mixtures, helps waterproof the soil and keep it stable, yet resilient.

Ease of application, lasting effectiveness, low first cost and tremendous savings in maintenance — these are the proved benefits of Texaco asphalt-cement pressure grouting.

Find out how you can benefit by this cost-saving method of roadbed stabilization. Call the nearest Railway Sales Division Office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.



SEND FOR this fact-packed, 16-page, illustrated book. Describes the development of asphalt-cement pressure grouting, outlines a practical working set-up, shows costs, and benefits secured by a leading railroad.

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TEXACO

TEXACO Emulsified Asphalt FOR GROUTING

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

Easy Operation

This is all there is to the "*Feather-Touch*" Clutch Control

you can't do this with a track crane

HERE is all you need for easy operation!—A simple device—free from high-pressure pumps and tubing—no delicate mechanisms—nothing to refill—unaffected by weather or temperature—simple, positive, dependable and proved in years of service—that's the Northwest "Feather-Touch" Clutch Control on the main drums.

The *feel of the load* is always present. The clutch action is in direct ratio to the movement of the operator's hand lever, release is positive and *there is no danger of shutdown because of control failure.*

Easy operation means high output, faster completion of the job, more work done before the line has to be cleared. It means less operator fatigue, greater safety and better control of the load. These are things that pay out in setting rail or steel, handling stone, placing culvert, handling concrete buckets and doing other jobs where a ground man or crew must aid closely in the operation. This is just one of the many Northwest advantages that make it preferred equipment on so many Class I Railroads. You had better plan to have it. Let us send you full details.

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THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

THE NEW WOOLERY TIE CUTTER—MODEL N

Improved Simplified Design
enables us to produce
A Better Machine at Lower Cost

INCORPORATING the basic features of the original WOOLERY Tie Cutter, the new improved Model N is a simplified, sturdy efficient machine which we are proud to offer Railway Maintenance Departments at a favorable ***reduction in price.***

This new lowered purchase cost has been made possible,—in spite of rising labor and material prices,—by skilled engineering to achieve production economies. At the same time, the redesigned Tie Cutter, with a more powerful engine, double roller chain drive, and more compact form saves time and back-breaking labor in the work of removing old ties with a minimum of roadbed disturbance.

The reciprocating cutting blade is adjustable for depth of cut and lateral spacing from rail or tie plate. Its average cutting time is 25 seconds per cut. Old ties cut in three pieces are easily pried out with a bar, using the center section as a heel and removing it last. The new tie is readily seated on a firm, permanent base requiring little or no tamping.

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TIE CUTTERS - WEED BURNERS - CREOSOTE SPRAYERS

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MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

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NOTE

- **SECURE GRIP ON RAIL**
- **LOCK AT OPPOSITE END**
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- **BEARING AGAINST TIE AND TIE PLATE.**

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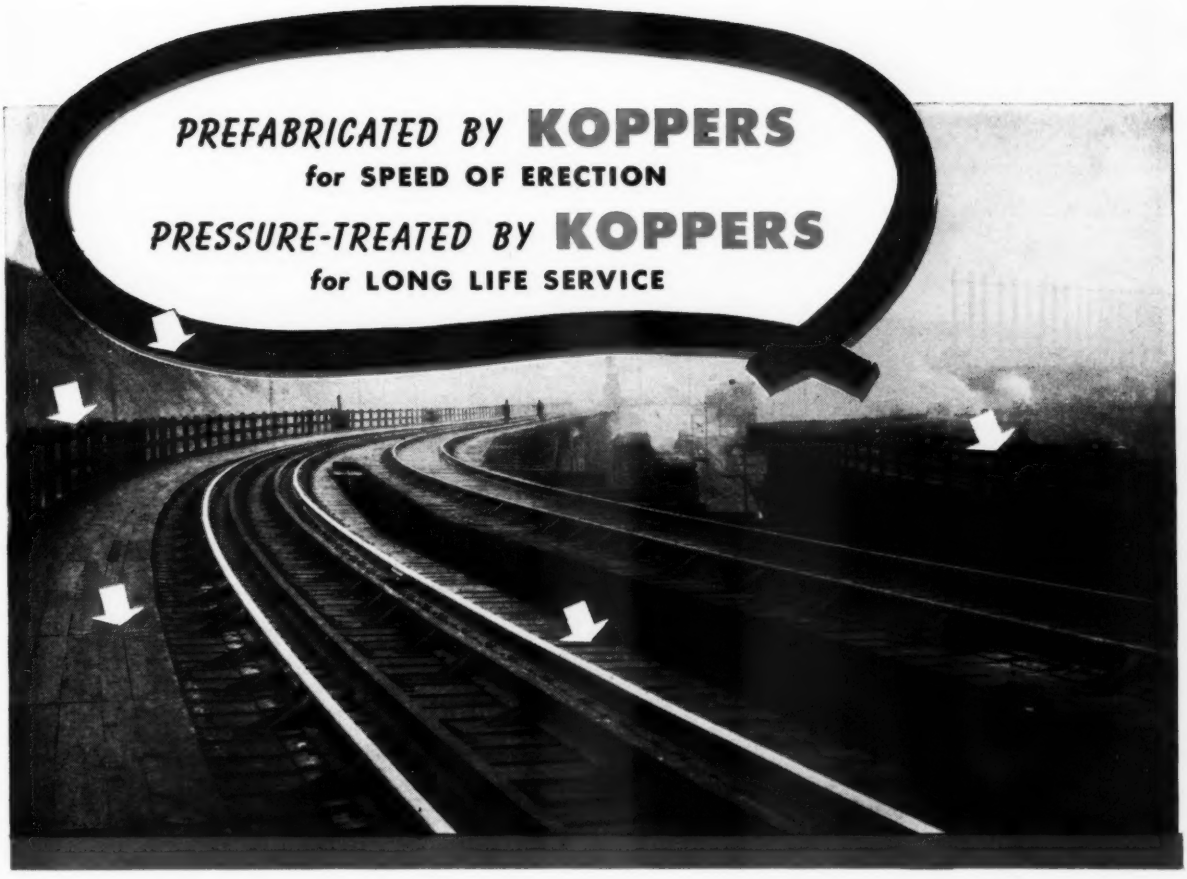


The "High Grade" bridge (left) and "Low Grade" bridge (right) illustrated were part of a larger project recently completed by the Union Railroad at East Pittsburgh, Pa. The bridge engineers used a proven method to expedite construction . . . *and to forestall premature destruction.* All bridge ties, walkway decking, filler blocks and bridge railing were prefabricated to blueprint, matchmarked where required, and pressure-creosoted at a Koppers treating plant. The material arrived on the job ready for assembly.

Leading railroads regularly utilize the fabrication service available at Koppers treating plants. Modern woodworking machines, manned by experienced workmen, perform all framing, boring, gaining and other specified operations economically and accurately. Costly, hour-wasting cutting and fitting on the job are practically eliminated. *Longer life, substantial savings in construction time, and minimum interference with traffic, all combine to make prefabrication a real economy.*

Further substantial economies are effected by pressure-creosote treatment. Railroad men know how pressure-creosoting extends the life of ties from an average of 5 to 7 years for untreated wood to 25 to 30 years for treated material. Similar increases in service life, and in overall economy, are being realized through the use of pressure-treated material in decking, filler blocks, railings, walkways, and similar parts.

Our representatives will be glad to tell you about Koppers fabrication and treating service, and how it can help you put new speed and economy into your bridge program.

K
KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC:
PITTSBURGH 19, PENNSYLVANIA

For additional information, use postcard, pages 465-466

MONOTUBE Steel Foundation Piles

PILE driving that's speedy and efficient—that gets construction jobs off to a solid start—is the kind you get with *tapered steel* Monotube piles.

That's why so many experienced engineers and contractors depend upon them. They've found on job after job that Monotubes have *extra* advantages on construction projects large and small.

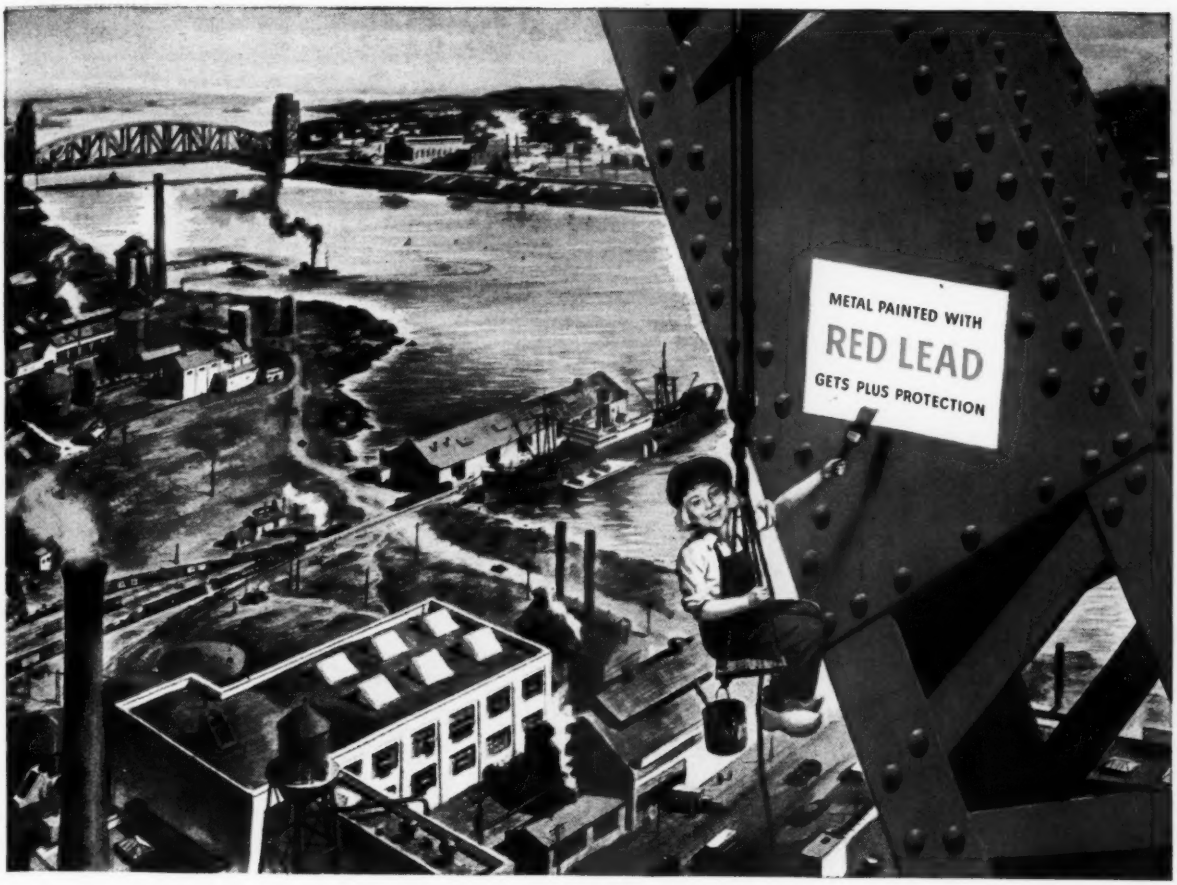
Here's why Monotubes make extra savings:

They drive faster because of their fluted, tapered construction.
They're driven with average job equipment—no core or mandrell needed.
They are easily extendible to any required length—*right on the job.*
They're easy to handle—light in weight.
Their tubular design permits thorough inspection before concreting.

For bridges, piers, buildings, airports, and highways—depend upon Monotubes to start construction jobs *right,* to make time-and-money savings. Available in gauge, size and taper to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles



Unique RED LEAD "Soaps" ... check Rusting 3 Ways

Scientific research shows why Red Lead has long been regarded as the "standard" metal-protective paint.

One interesting factor is Red Lead's ability to react with the vehicle and produce unique lead "soaps."

These "soap" formations grow to form a tough, impervious, intermeshing matrix within the paint film, as shown in the photomicrographs below. These "soaps" help Red Lead inhibit rust three ways.

1. Toughen Paint Film. Radiating from central cores the "soap" formations develop long, rod-like projections, which spread out and interlock. Thus, they form a dense intermeshing structure that *mechanically* reinforces and toughens the paint film.

2. Make Film Water-Resistant. The very structural formation of these "soaps," with their thick, impervious matrix of closely-knit fibres, helps restrict the passage of moisture through the paint film. And metal cannot rust without the presence of moisture.

3. Keep Film Flexible. The "soap" formations, far from being rigid, allow movement all along their soft, intertwining projections. The resulting flexibility helps prevent the ruptures to which a hard, unyielding paint film is subject. Thus the lead "soaps" aid in maintaining the continuity of the paint film.

Lead "soaps" form primarily in the dry paint film as it ages. This is where the "soap" formations impart their greatest benefits. When a paint film weathers and ages, decomposition products of the vehicle are formed. Red Lead's ability to slowly combine with these decomposition products actually enhances the life of the paint film. Red Lead's slow rate of reaction means the film age-hardens at a slower rate. It thus retains a high degree of flexibility, a great factor in its lasting adhesion.

The photomicrographs above show how Red Lead "soaps" progressively spread out as they grow and thus reinforce the paint film.

Remember, too, Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

The rust-resistant properties of Red Lead are so pronounced that it improves *any* metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

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RED LEAD

This "ONE CRANE GANG" can do all these jobs

HANDLING — RAILS AND FROGS, SCRAP AND BALLAST

LIFTING — HEAVY MATERIALS OF ALL KINDS INCLUDING TEAM TRACK SERVICE

CLEANING — ASH PITS AND DITCHES

WORKING ON — YARD AND ROAD SERVICE, BRIDGE CONSTRUCTION, FUELING AND AUXILIARY STORAGE, STOREKEEPERS TRAIN

DOING — HEAVY ODD JOBS OF ALL KINDS

The Frisco Lines *finds plenty of work for a new Lorain 41.*

RAILROAD users find it no trick to keep a Lorain-41 busy. The speed, ruggedness and travelability of this ¾ yd. unit recommends it for many important, off-the-track, right-of-way assignments. And, when it does return to the yard, there are a dozen and one material handling jobs waiting for the services of this versatile unit.

A quick change of booms enables the Lorain-41 to operate either as a crane, clamshell, dragline, shovel or hoe. Choice of 2-speed, chain drive crawler or Moto-Crane rubber-tire mounting permits you to match mobility to your job requirements.

Yes, the ¾ yd. Lorain-41 is truly a "one crane gang" that can cut costs and speed work on not one but scores of railroad jobs. For complete information, write or call your local Thew-Lorain distributor.

Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

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New high-speed rubber-tired

Model C

Speeds up to 15 m.p.h., forward and REVERSE
4 speed selections from 1.67 m.p.h.

Non-stop, instantaneous speed selection
Constant-mesh Tournamatic transmission.

Easy to operate ... air-actuated controls
Finger-tip steering, blade operation ... single pedal for brakes.

Tapered-bead tires ... 14.00x32 or 21.00x25
Permit low pressure ... give ground-gripping traction ... flotation.

Big load capacity ... 11′ 2″x43″ blade
Blade lift 44″; drop, unlimited; cable controlled; fast-acting.

180 h.p. Diesel ... weight 14½ tons
Other sizes of TOURNADOZERS will follow soon.

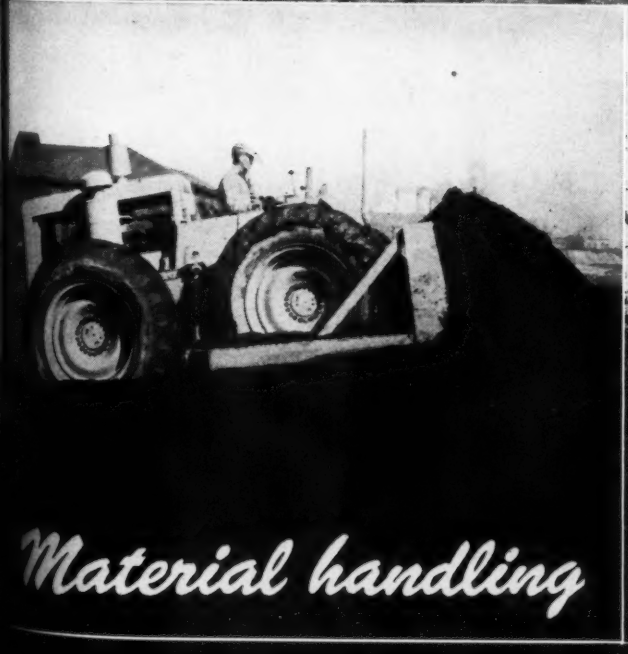
Pusher loading

LET

See your Le Tourneau Distributor NOW for complete information

TOURNADOZER

Dirtmoving



Material handling

Clearing

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

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SUPER STEEL ALLOY TRACK TOOLS

Through many years of safe and satisfactory service, HUBBARD TRACK TOOLS have proven their economy. Finest Quality—Most Dependable Service—Longest Life.

To be certain of QUALITY TRACK TOOLS Specify HUBBARD "SUPER STEEL."

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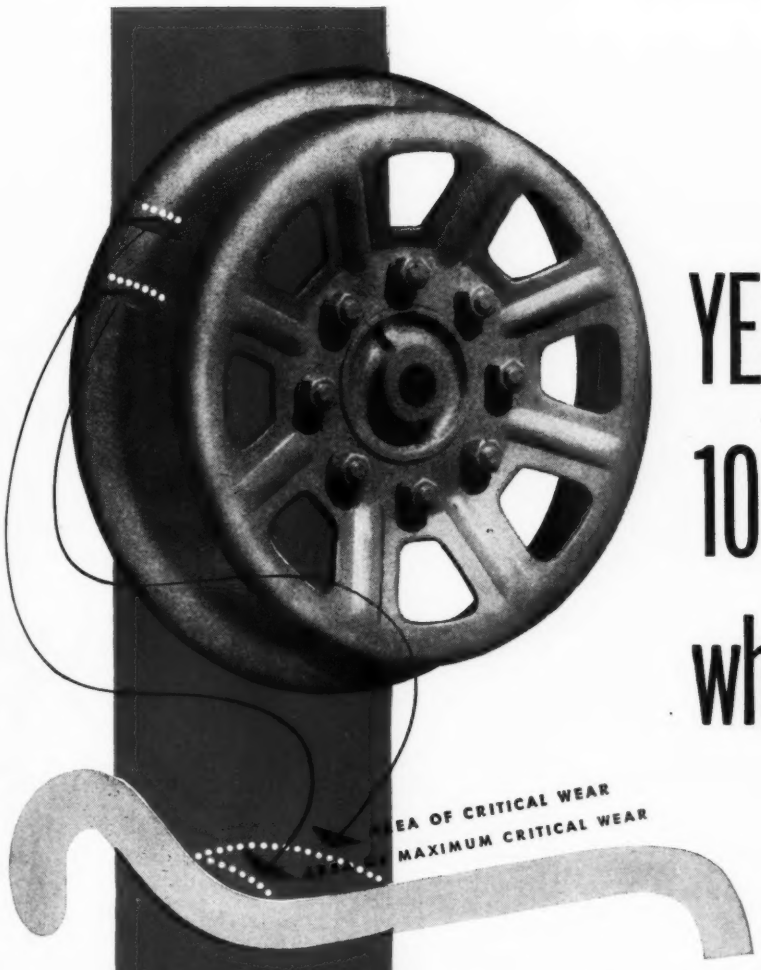

YES... 10 to 15% more wheel mileage!

Fairbanks-Morse Demountable-Hub Wheel Has Extra Thickness at Area of Critical Wear

Here's a one-piece, solid steel demountable-hub wheel that gives a minimum of 10 to 15% longer mileage! The Fairbanks-Morse method of cold-pressing gives extra thickness at the area of maximum critical wear—a thickness that is 10 to 15% greater than the average wheel tread thickness outside this area!

Utilizing a die-forged demountable hub, the new Fairbanks-Morse Demountable-Hub Wheel requires no special tools for mounting or demounting.

It is available in standard A.R.E.A. 16- and 20-inch sizes, plus a newly developed 14-inch size. Full details are set forth in a new descriptive bulletin—send coupon for it today.

Fairbanks, Morse & Co.
Dept. Y
Chicago 5, Illinois

Gentlemen:
Please send new bulletin on Fairbanks-Morse Demountable-Hub Steel Wheels with new die-forged steel hubs.

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Address_____

City_____

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A name worth remembering

Diesel Locomotives
Diesel Engines
Generators • Motors
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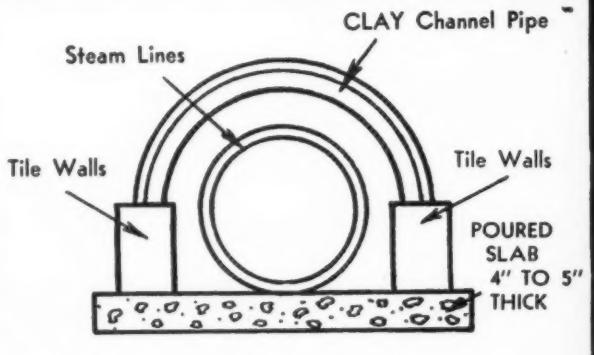
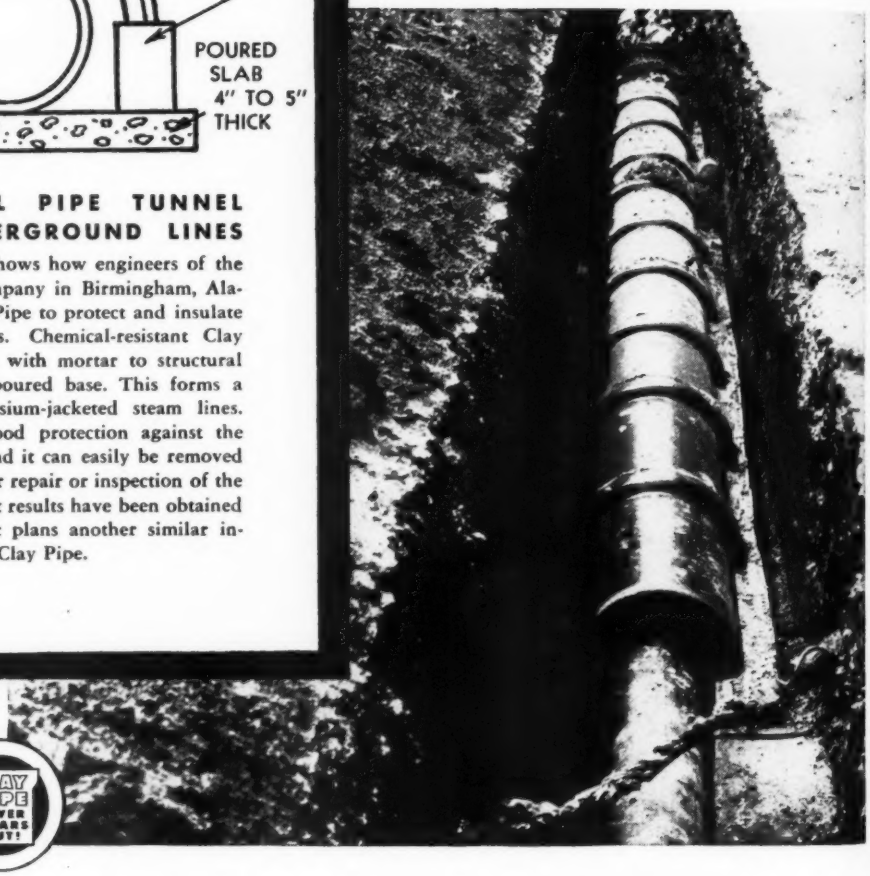
RAILROADS HAVE MANY USES FOR CLAY PIPE



CLAY CHANNEL PIPE TUNNEL PROTECTS UNDERGROUND LINES

Cross-sectional diagram shows how engineers of the Birmingham Electric Company in Birmingham, Alabama, use Clay Channel Pipe to protect and insulate underground steam lines. Chemical-resistant Clay Channel Pipe is grouted with mortar to structural tile sidewalls set on a poured base. This forms a "tunnel" for the magnesium-jacketed steam lines. The Clay Pipe offers good protection against the dampness of the earth, and it can easily be removed to provide quick access for repair or inspection of the steam lines. Such excellent results have been obtained that Birmingham Electric plans another similar installation of 2800 feet of Clay Pipe.



CLAY PIPE NEVER WEARS OUT!

THE same durability and corrosion-resistance that have made Clay Pipe the traditional material for railroad sewerage and drainage installations is winning wide approval in solving many other problems for railroads. Clay Channel Pipe is ideal as insulation for underground lines, such as those carrying heat or power between power plants and sidings, terminals and other buildings. Clay Pipe can also be used safely to carry roundhouse and shop waste containing chemicals that would soon destroy most other pipes. Extra-Strength Clay Pipe is especially useful for track drainage because it stands up under heavy loads and can take the vibration of modern high-speed trains. For information about your Clay Pipe problems, write to the nearest regional office listed below.

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522 First National Bank Bldg., Atlanta 3, Ga.
1105 Huntington Bank Building, Columbus 15, Ohio
571 Chamber of Commerce Bldg., Los Angeles 15, Calif. C-947-4-C

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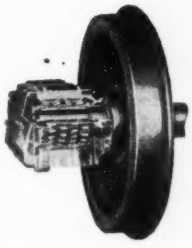
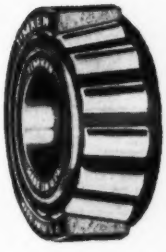
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.





Means "Made By The Timken Roller Bearing Company." It identifies the source of Timken Tapered Roller Bearings, Timken Railroad Roller Bearings, Timken Alloy Steel, Timken Seamless Steel Tubing and Timken Rock Bits. This trade-mark is your assurance of getting genuine Timken products. Look for it when buying.

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO

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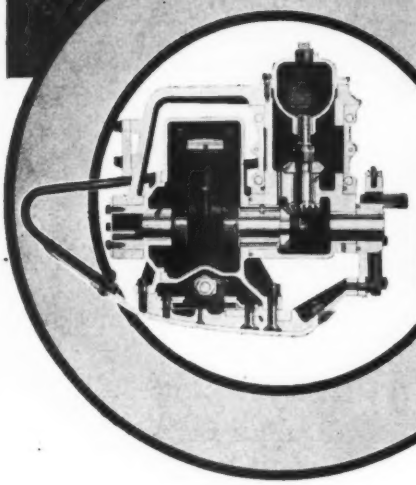

Control weeds the *low cost* way

. . . mow 'em down fast and clean— with safe, dependable, economical LE ROI Centaur Mowers

You can mow at any angle — from the vertical to 45 degrees below the horizontal — with a Le Roi Mower. It's just what you want for right-of-way service. Balanced design — low center of gravity — enables this nimble unit to ride slopes safely where other equipment can't travel at all. Wheels can be reversed, giving wider tread. And look where the operator sits — in safety out beyond the entire unit. Finger-tip vacuum-power control moves the cutter bar easily and quickly. Automatic cutter-bar release eliminates danger, when hidden objects are struck.

And cut — you should see this baby wade through heavy, tangled weed growths; June grass, briers, cane, vines — year-old growths of any kind. The answer, of course, to such clean, fast cutting performance is plenty of dependable power.

But, agile mowing ability isn't the only reason for standardizing on Le Roi units. These mowers are built to take it — to stand up under the toughest kind of conditions. The new Le Roi mowing head, for example, is sealed in oil. You can run an entire day without need for lubrication. This mowing-head design is exclusive with Le Roi. It is foolproof, and provides longer life, less down time for servicing. In addition, Le Roi Mowers have forged steel gears, hardened and ground; enclosed drive to keep out dust; and the famous Le Roi heavy-duty, industrial-type D-140 valve-in-head engine. Again we say — built to take it.

Put Le Roi Mowers to work, and watch your costs—both operating and maintenance—tumble. For complete details and bulletins, write to the Railroad Sales Department, 327 S. La Salle Street, Chicago 4, Illinois.

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SUBSIDIARY OF THE DOW CHEMICAL COMPANY

Do your water lines look like this?

Clean water lines quickly, economically, safely the chemical way!

When efficient operation of water lines is the goal—when a full, free flow of water means something in dollars and cents, Dowell's *chemical* cleaning service merits careful consideration.

The modern, tested Dowell method for quickly and safely removing accumulated scale and sludge has proved effective in water lines everywhere—underground—above ground—indoors or out. Dismantling is unnecessary—even small lines complicated by bends, elbows and valves have been restored to designed capacity. The lines are filled through the regular connections with specially selected liquid solvents designed to dissolve and disintegrate the scale and sludge.

Leading railroads, utilities and other industries rely upon Dowell service engineers to perform the entire cleaning operation—bringing with them adequate equipment—special truck-mounted tanks, pumps, mixers, heaters—to control every stage of the successful job. Ask for free booklet—"More Power to America's Industry!" Illustrated in color, it shows how Dowell specialists chemically clean water lines, steam generating equipment, heat-exchangers and many other types of equipment.

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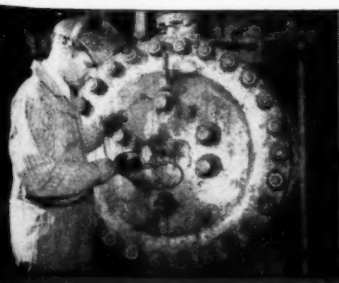
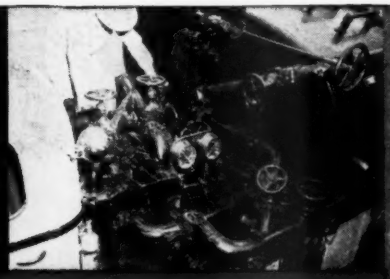
New York, Philadelphia, Boston, Baltimore, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, Kansas City, Wichita, Oklahoma City, Houston, Fort Worth, Shreveport, Mt. Pleasant, Michigan; Salem, Ill.; Borger, Texas; Wichita Falls, Texas; Midland, Texas; Lafayette, La.
Long Beach, Casper: Dowell Associate—International Cementers, Inc.

Dowell's industrial engineers are thoroughly experienced in successful chemical cleaning. They are supported by the full research and technical resources of Dowell's own laboratories.

Dowell's field equipment includes the most modern types of scientific devices. Solvents for Dowell chemical scale removal service are mixed especially to fit each individual job.

FREE SHOWING! *New 18-minute sound slide film illustrating the possibilities of Dowell Chemical Scale Removal Service. To arrange a special showing call or write Dowell.*





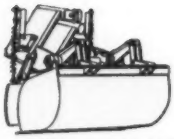
DOWELL

FOR INDUSTRIAL CHEMICAL SERVICE

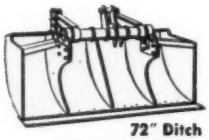
The NEW

LESS THAN 15 MINUTES TO CHANGE ATTACHMENTS!

A variety of standard and special tools are quickly interchangeable by simply loosening 2 hex nuts and withdrawing a pin. Shown here are only a few of the standard tools. Many more are available.

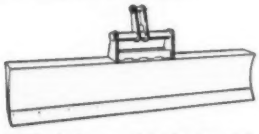


48″ Cleanup Bucket;
72″ Bucket for snow removal



72″ Ditch
Cleaning Bucket

47″ Pavement
Removing Bucket



8'0″ Blade—furnished with plain and serrated cutting edges

32″ Digging Bucket
36″ Digging Bucket

Pavement Ripper

GRADALL DOES ALL THESE JOBS WITH EASE AND PRECISION

- Trench Digging
- Widening Cuts and Fills
- Excavating
- Restoring Embankments
- Ripping and Loading Old Paving
- Ditch Cleaning
- Sloping and Grading
- Back Filling
- Snow Removal and Loading

For additional information, use postcard, pages 465-466

GRADALL

Outstanding FOR RAILROAD MAINTENANCE WORK

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...illustrating Gradall's many uses. Gives dimensions, operating ranges and mechanical specifications.

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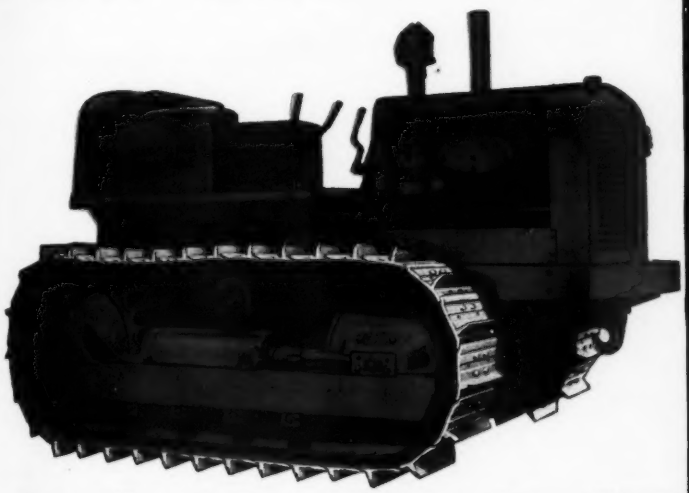

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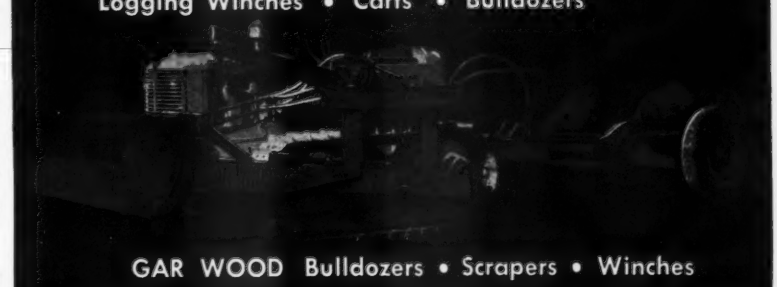

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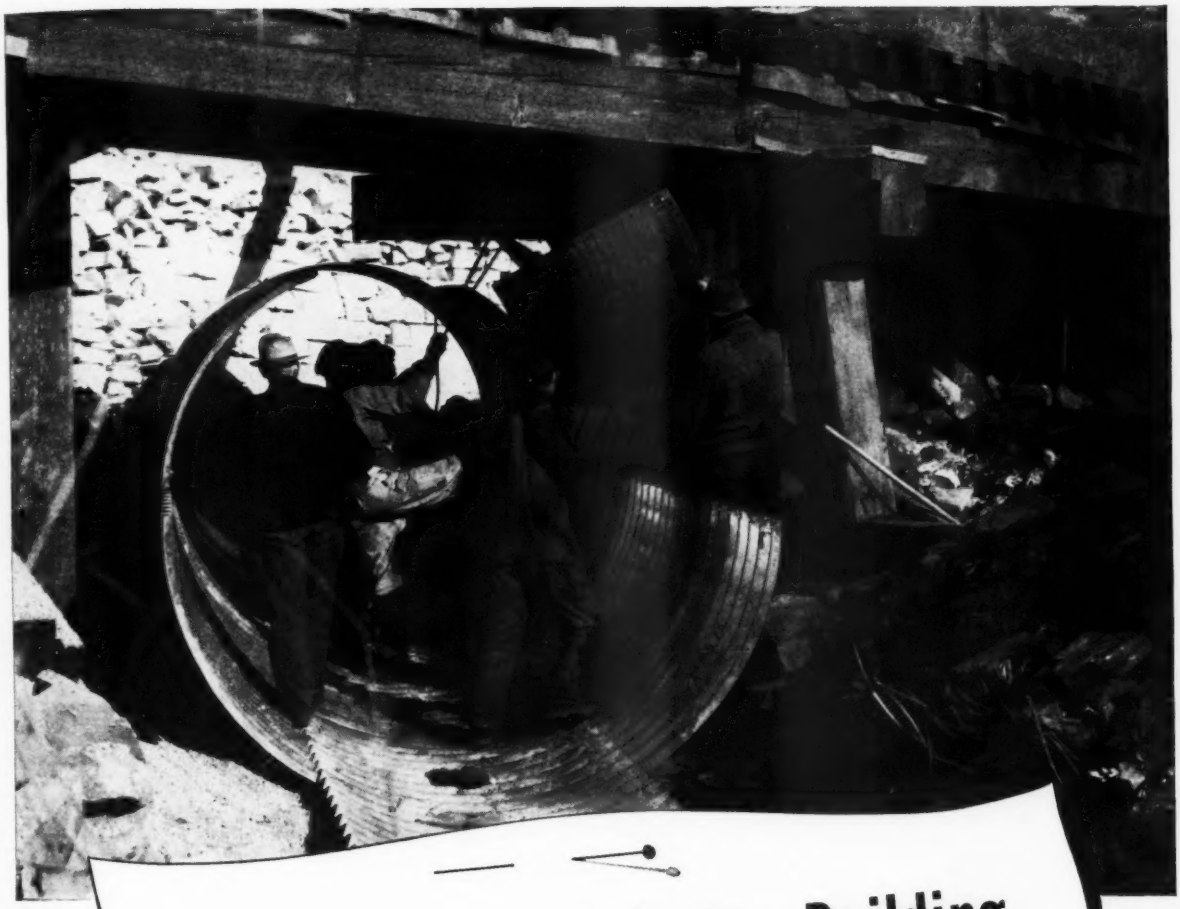

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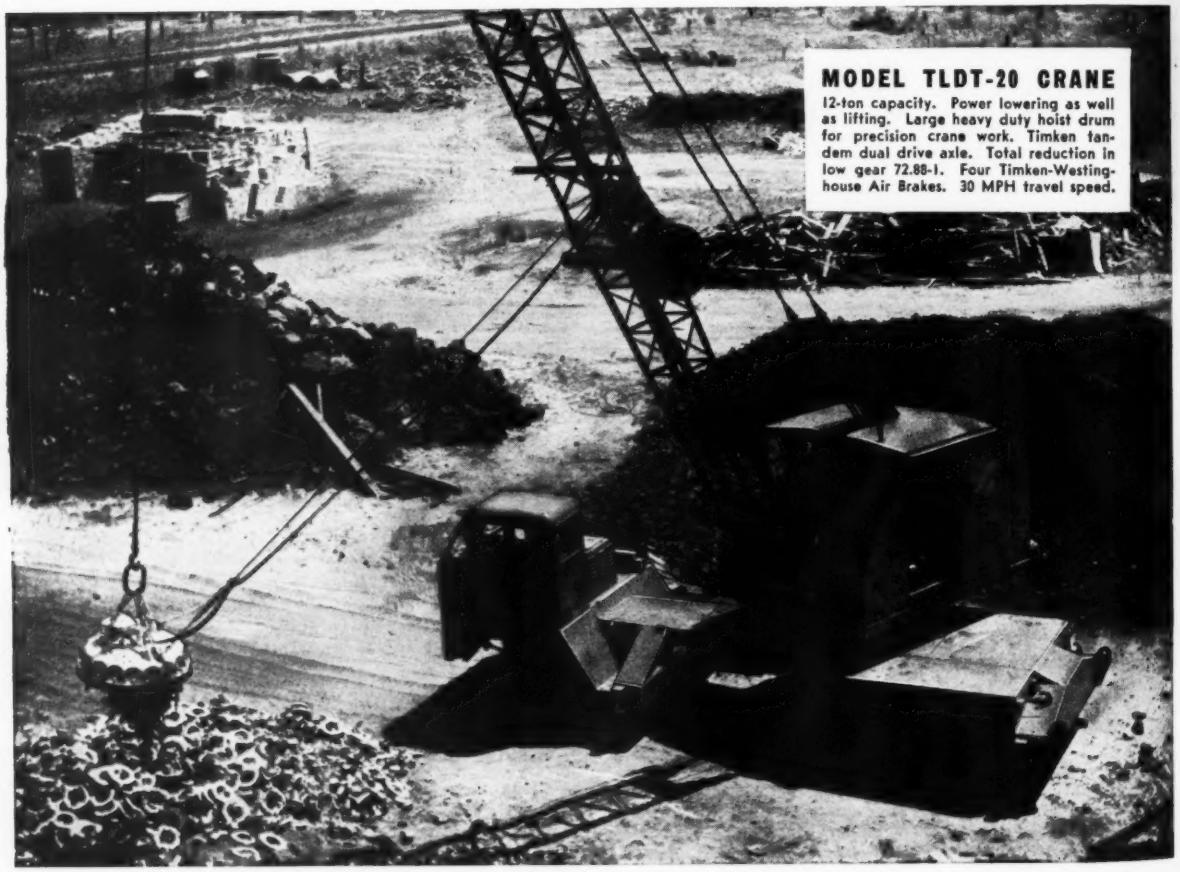

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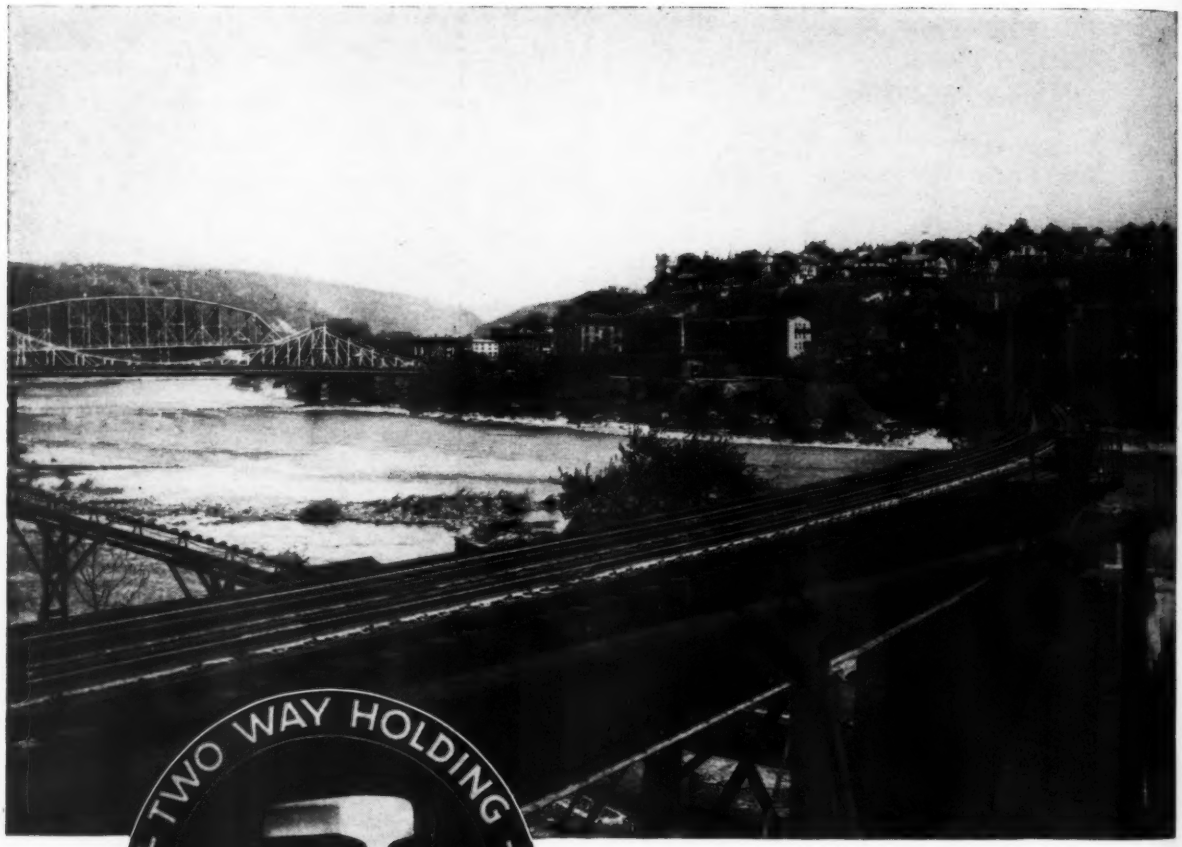
Rail Anchors



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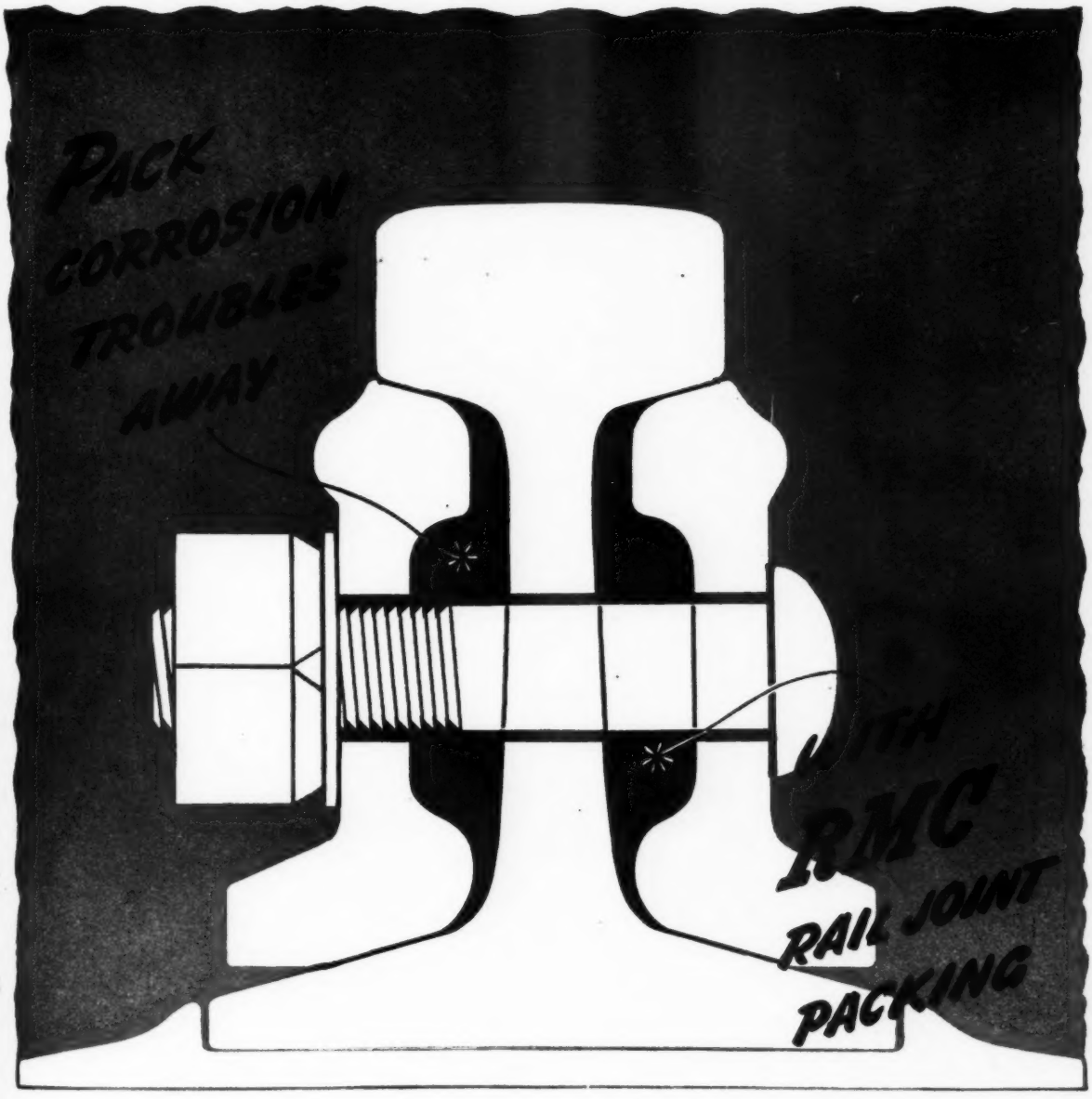
On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

PRODUCTS INDEX (Continued)



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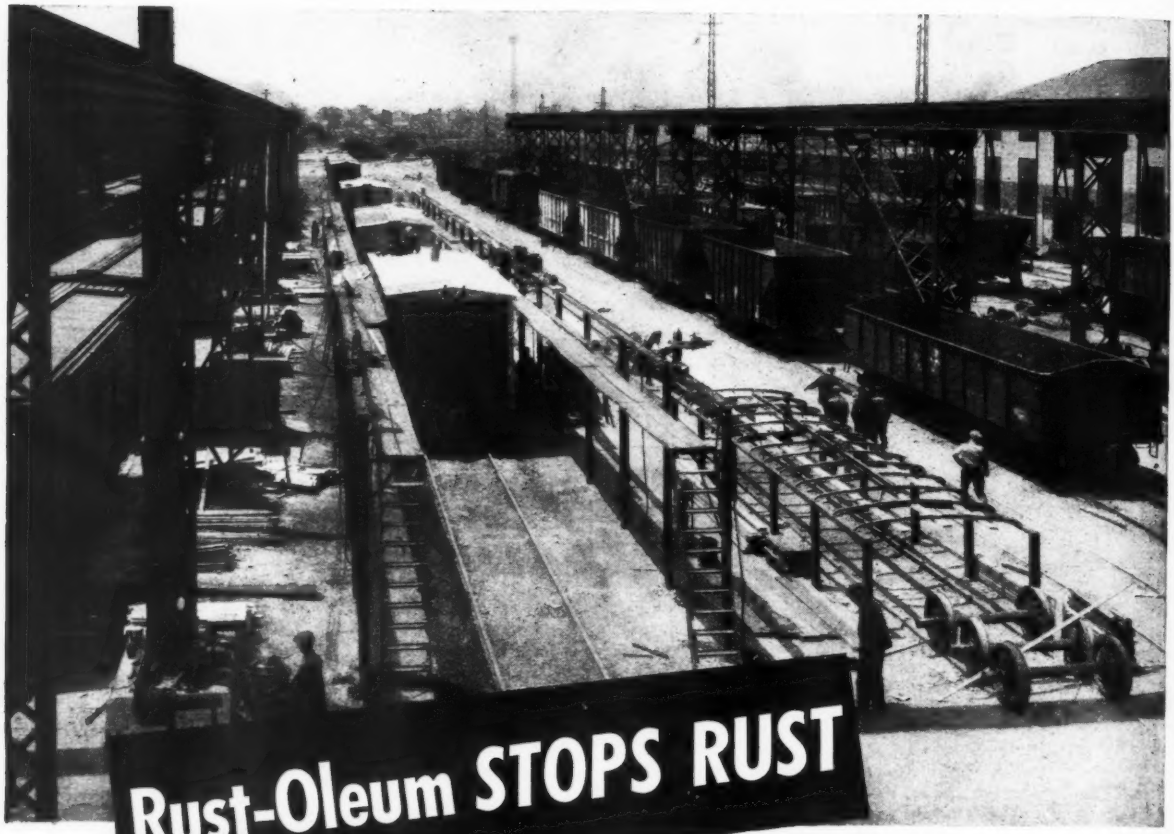
PITTSBURGH 30, PENNSYLVANIA



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APPLY BY BRUSH, DIP OR SPRAY

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2 AIR-OPERATED CONTROLS THROUGHOUT.

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POWER

No. 221 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: No Change in Policy

May 1, 1947

Dear Readers:

A good editor is constantly thinking about and analyzing the kind of material he is supplying his readers through his publication. Especially in the case of a trade publication designed specifically for a selected group in a single industry, such as is Railway Engineering and Maintenance, it is always his readers' wants and needs in the solution of their many problems that is constantly on the editor's mind.

Seldom there comes a press time when there is not available many times the volume of material that can be used in any one issue, and each day brings in more, often with pressure of one kind or another for publication. What to do is always the problem.

But Railway Engineering and Maintenance solved most of that problem with its very first issue back in 1916, when it dedicated its efforts to the specific interests of its readers, and set up a policy of determining what it would publish, and how extensively it would treat each individual article, always with the best interests of its readers in mind—all other considerations to the contrary.

This policy has been misunderstood at times by some of our friends in the railway supply field, with their natural enthusiasm for certain classes of work and specific products, but never by our readers. Sometimes, it is true, it has led to long, detailed articles that have called for careful and thoughtful reading. Sometimes, too, it has called for solid pages of type, with limited illustrations, which are anything but attractive in appearance—but always it has attempted to give you—what you have never been able to get from other sources, at least with such punctuality—the details of those developments in your field that we feel will be of greatest interest and help to you.

Railway Engineering and Maintenance is not a publication to be paged through and thrown away, and while it does lend itself to quick review to gain the highlights of what is taking place in the field, we have too much evidence of many kinds to believe that it is lightly pushed aside. In the first place,our large paid circulation and exceptionally high renewal rate indicate more than ordinary reader interest. Then, too, the practice of so many of you of reading Maintenance when on the road, and your requests that your copy be sent to your homes, are indications of this interest. Likewise, your widespread practice of passing your personal copies, or the extra copies that come to your offices, down the line, is evidence of your approval. And now we have further evidence of the widespread distribution and careful readership of Maintenance as, even at this late date, requests continue to come in for additional information relative to products described or advertised in our February issue—the first issue in which "request" post cards were inserted.

No—at least until we have evidence of your desires to the contrary—we shall not deviate from our long-standing policy of putting your interests first in everything that appears in Railway Engineering and Maintenance.

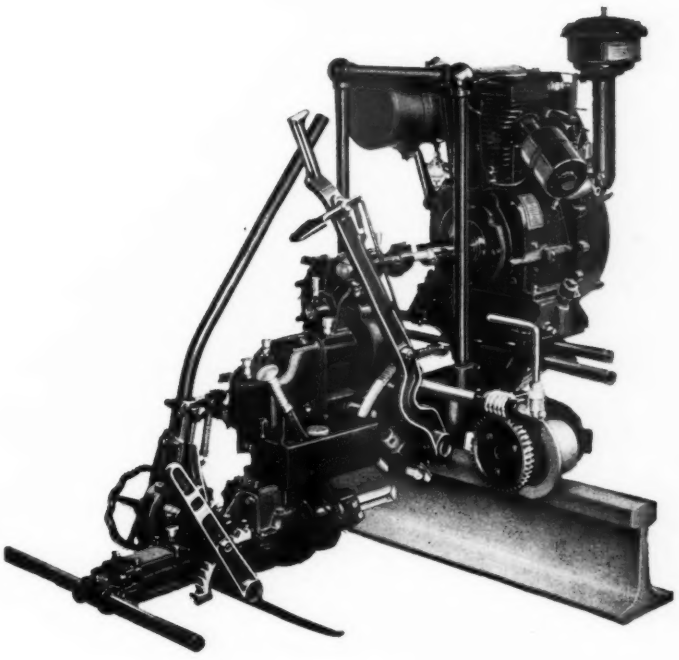
Sincerely,

Neal D. Howard

NDH:jb

Editor

The EVERETT Power M-W Drill



Requires but one rail and one man for its full operation.

Can be quickly freed and tilted off the rail by one man.

Clamps positively, either to rail or over angle bars.

Can be aligned with hole in angle bar, then positively clamped for drilling through angle bar hole.

Gives a clear view of angle bar hole or prick punch mark.

Has all needed adjustments which are quickly and accurately made.

Is quickly raised or lowered to exact vertical position by ratchet.

Has spirit level for leveling machine on tangent track.

Has force feed oiling device for oiling cutting edges of bits.

Has rack and pinion for feeding the bit, which long experience has proved the best method.

Operator has the "feel" of the bit, enabling him to avoid ruining bits.

Operator can also tell when bits need sharpening, avoiding excessive strain on thrust bearings or machine frame from forcing dull bits.

Keeps bits sharper longer.

Has behind it 20 years of development and satisfactory service.

Has splendid record of freedom from service interruptions and repair jobs.

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Railway Engineering and Maintenance

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MAY, 1947

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3. Ties the entire crossing into one unit.
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5. Makes the use of straps and other arrangements for the prevention of creepage unnecessary.
6. Because of ruggedness of structure, maintenance costs, especially at heel joints, are materially reduced.

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Railway Engineering and Maintenance

Railway Purchases—

Well Above Pre-War Level in First Full Post-War Year

Anyone who thinks the railroads are "small potatoes" when it comes to the size of their annual purchases from other industries of the country, or that railway buying in 1946 was off seriously from war-time highs, will gain enlightenment and considerable satisfaction from the figures on last year's purchases by the railways, released by the Association of American Railroads on April 7. To both those within the industry and those supplying the industry, the figures should also give a sense of security—security in the fact that railway activity, as measured by purchases, was not in a serious slump during the first full year after the war, as it was so freely predicted it would be, but that purchases, on the contrary, were larger than in any year since 1926, with the single exception of 1944.

Specifically, the purchases of materials, supplies, fuel and equipment by the Class I railroads of the United States in 1946 amounted to $1,889,572,000, which was greater by $2,389,000, or 0.01 per cent, than the $1,887,183,000 spent for these purposes during the preceding year, and only $49,188,000, or 2.5 per cent, under the peak war-time purchases of $1,938,760,000 in 1944.

Purchases of materials and supplies alone from manufacturers in 1946 aggregated $1,017,402,000. This total exceeds the $1,017,249,000 spent for similar materials and supplies during 1945, and while it is slightly less than the $1,024,697,000 expended in 1944, it is, nevertheless, larger than in any other year since 1926.

For fuel alone, the railroads expended $553,153,000 in 1946; for iron and steel products of all kinds—$520,546,000; for forest products—$148,984,000; and for miscellaneous materials and supplies—$347,872,000.

Breaking down some of these items, particularly as they pertain to products employed by the engineering and maintenance forces, shows that the railroads spent $88,478,000 in 1946 for crossties—an increase of 14 per cent over the $77,389,000 spent for this purpose in 1945; $7,828,000 for switch and bridge ties—an increase of 17 per cent over the $6,689,000 spent for such ties in 1945; $46,134,000 for lumber and bridge and building timbers of all kinds—an increase of 2.7 per cent over the $44,921,000 spent for similar supplies in 1945; $65,302,000 for new and second-hand rail—or 15 per cent less than the $77,038,000 spent in 1945; $24,580,000 for switches, frogs and crossings—an increase of 13.5 per cent over the $21,653,000 spent for this special trackwork in 1945; $6,929,000 for steel bridges, turntables and other structural steel—an increase of 3.8 per cent compared with the $6,673,000 spent in the previous year; and $28,987,000 for signal and interlocking material—an increase of 0.37 per cent compared with the $28,880,000 spent for these materials in 1945.

And so the story goes—millions for this and millions for that—every dollar of which the railroads paid out of their own pockets, with no subsidies of any kind. All this should give those working for the railroads a sense of pride and satisfaction—pride, that they are a part of a huge and indispensable servant of the public and their country, and satisfaction, that their industry does not stand at the public trough for favors and hand-outs.

These figures should also indicate clearly to every employee that the railways, to pay their huge bills for materials, equipment and supplies—not to mention the more than twice as large outgo for labor—must have huge gross earnings—allowed on the one hand by those agencies of government that tax and regulate them, and, on the other hand, won by superior and ever-improving service. Without such earnings, whether as the result of an excessive tax burden, arbitrarily restricted rates and fares,

unfair competition, or failure on the part of the roads themselves to produce the service desired, the huge annual expenditures of the carriers must be restricted, with adverse affects on every employee and on the millions of people in other industries who are depending upon railroad prosperity for their well-being.

Bridge Fires—

Placing Emphasis on Preventive Measures

FIRES continue to take a heavy toll of railway bridges, especially open-deck timber trestles. In 1945, the latest year for which official figures are available, there were 280 fires affecting railway bridges in the United States. Many of these were relatively minor with the damage being either confined to small structures or to localized parts of larger ones. Some of them, however, could be placed in the category of first-rate disasters involving the partial or complete destruction of long structures with resulting heavy loss of property as well as the still heavier indirect losses incident to the interruption of traffic. The isolated location of many of these bridges was, in many cases, a large factor in the extent to which the structures were damaged.

Considering all the measures that are available for keeping bridges from becoming ignited, as well as for dealing with fires after they have once started, the fact that bridge fires occur with such frequency and often get entirely out of hand is rather surprising. The answer seems to lie with one of two alternatives—either there are shortcomings in the protective measures used, or these measures are perhaps not being applied as widely as the needs of the situation demand. The weight of available evidence seems to support the premise that effective protective measures are available and that fewer disastrous bridge fires would be experienced if these measures were in more common use.

Obviously, any effective scheme for reducing bridge fires to a minimum should include an adequate organization and equipment for dealing with such fires after they have been detected. All too frequently, however, bridges are situated at points remote from the location of fire-fighting equipment, with the result that, because of the time required to get to the scene, the fire may be entirely out of control by the time any kind of a fire-fighting organization has been assembled at the site. For this reason it would seem that the best line of defense is one that emphasizes those measures, to be incorporated in the structure itself, that are designed either to prevent fires from starting or, if they once gain a foothold, to keep them localized.

A number of schemes have been devised for achieving this end. One of the latest of these, involving the application of a coating to the top surfaces of the deck of each structure consisting of washed crushed stone held in place by a special asphalt binder, is being used by the Southern Pacific, as described in a feature article in this issue by U. S. Attix, general fire inspector of that company. Other effective schemes are also in use for preventing bridge decks from becoming ignited by sparks, coals, embers or other sources coming from above. For localizing fires after they have started a number of railroads are making effective use of fire curtains of different types which are placed at intervals in each structure in such a manner as to isolate the adjoining sections completely from each other. Few persons will claim that these or other measures now in use are 100 per cent effective, but at least they may be expected either to prevent a large majority of the fires that would otherwise occur or to check their progress until they can be dealt with by the fire-fighting organization.

When an important bridge is seriously damaged or destroyed by fire it is not uncommon for the owning railroad to incorporate effective fire-preventive or control measures when the structure is repaired or rebuilt. One way to look at the matter is that in all probability the loss could have been avoided or held to a minimum if the original structure had been so endowed.

On or Off Track?

Significance of the Present Trend

A GREAT deal of emphasis has been placed in recent years on the trend toward the use of off-track equipment in maintenance of way work. There is no question but that the use of such equipment is accompanied by many advantages under certain conditions and for certain types of work, particularly in view of the many improved types of off-track equipment that have been introduced in recent years, some of which have been designed especially for use in railway maintenance work. There is, likewise, no question but that recent years have seen a considerable increase in the use of such equipment, and it is quite possible that the future will witness a continuance of this trend.

However, the facts at hand do not seem to warrant the conclusion that off-track equipment as a whole is rapidly displacing that which is designed to operate on the rails, nor that this contingency is likely to take place in the foreseeable future. The truth is that, for many operations and under certain conditions, on-track machines are holding their own admirably well. In fact, developments of the past year have given evidence that a number of track-mounted machines are doing even more than simply holding their own, especially in situations where it is possible to occupy the track for any length of time.

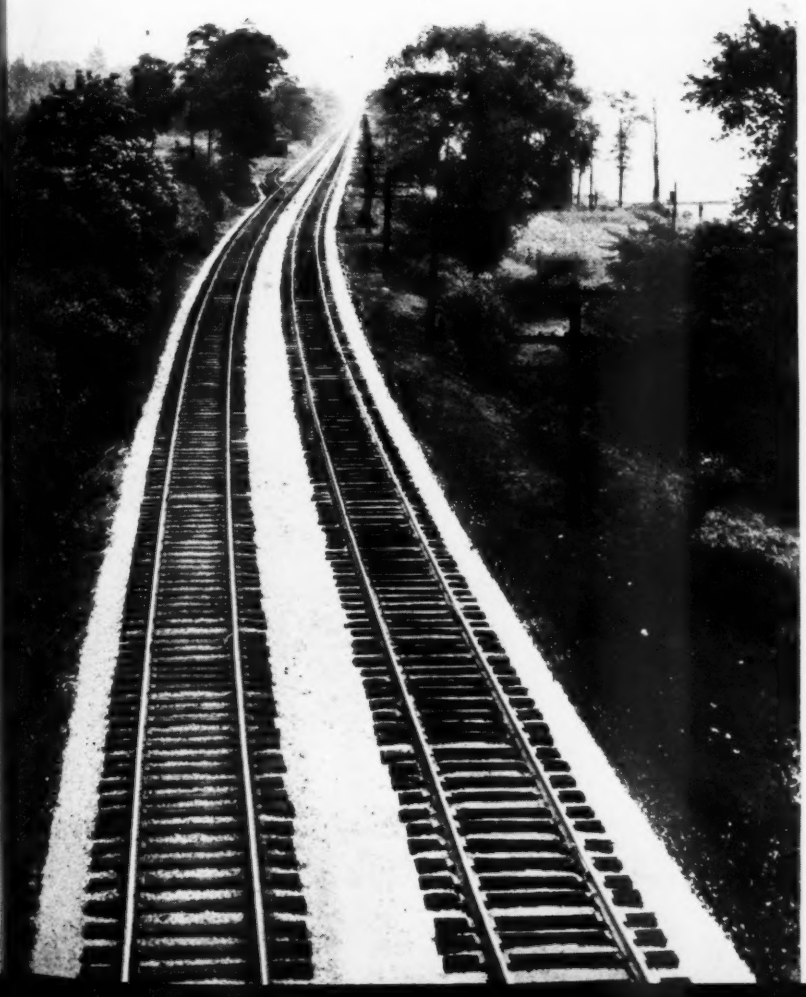
What has happened as the result of the development or adaptation of equipment for off-track work is that there is now available a wider choice of machines for doing the various maintenance operations, so that the maintenance man may make a selection between those for on-track use, others for operation off the track and even still others that are designed to operate both on and off the rails. There are, of course, many factors to be taken into consideration in determining which of these types of machines will produce the better results in performing a given operation. The progressive maintenance man will continue to view them impartially as tools for doing the work at hand, to be chosen for use on specific jobs on the basis of the type of work involved, the conditions prevailing locally, and the relative performance under these conditions that may be expected of the various machines available.

Late last year the Pennsylvania began the reballasting of an important 69-mile, double-track freight line, known as the Bayard cut-off, and completed approximately 36 track-miles before the end of the working season. Of the 102 miles remaining to complete the project, 60 miles are programmed for 1947. In the 1946 work the track was raised a minimum of eight inches above the old cinder bed, requiring approximately 80,000 tons of ballast. By the use of power jacks and power tamping machines, and with the cooperation of the operating department, the work was carried out in a highly efficient manner as described in this article.

The First of a Pair of Nordberg Power Jacks Raised the Track to the New Grade Indicated by the Grade Stakes

Machines Speed

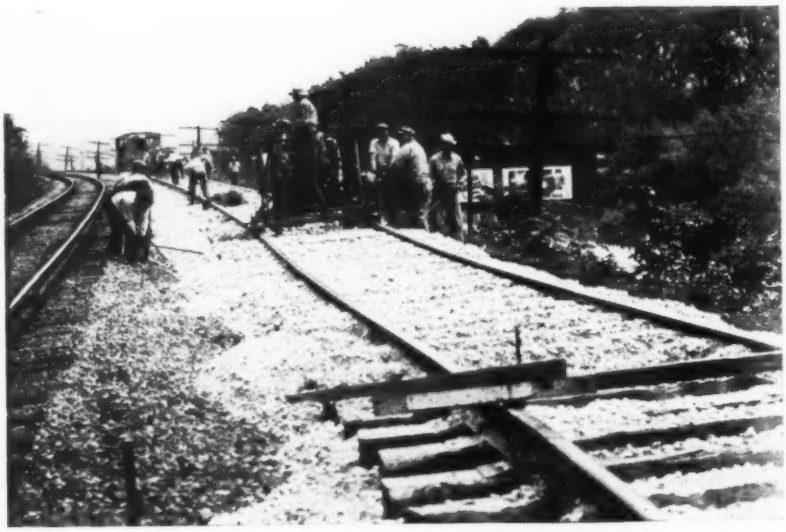
Large Reballasting Project



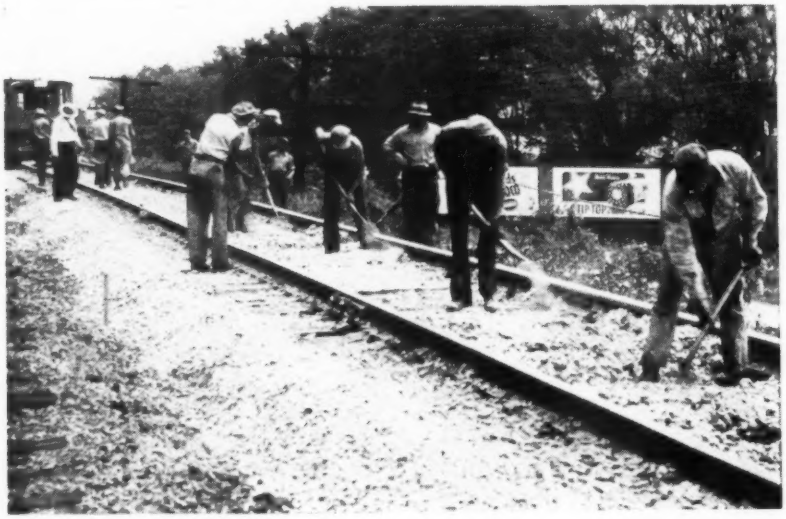
ONE of the more important track-rehabilitation projects undertaken during 1946, and one which, it is planned, will be further progressed during the current year, is the Pennsylvania's track-raising and reballasting program on its important 69-mile, double-track freight line, known as the Bayard cut-off. Approximately 80,000 tons of ballast were used last year in converting 36 track-miles of this line from cinder to stone ballast and an estimated 134,000 tons will be required in the 1947 program. To insure a substantial ballast bed, the track is being raised a minimum of eight inches, with efficient and expeditious use being made of hydraulic jacks and power tamping equipment. The work is being progressed in sections, insofar as conditions will permit, and, as each section is completed, the authorized speed for trains is being increased. With its completion, the allowable speed of trains over the entire cut-off will be raised to 50 miles per hour except for local speed restrictions.

The Bayard cut-off is a low-grade freight line which forms a part of the Pennsylvania's Eastern division and leaves the main line at Rochester, Pa., 26 miles west of Pittsburgh,

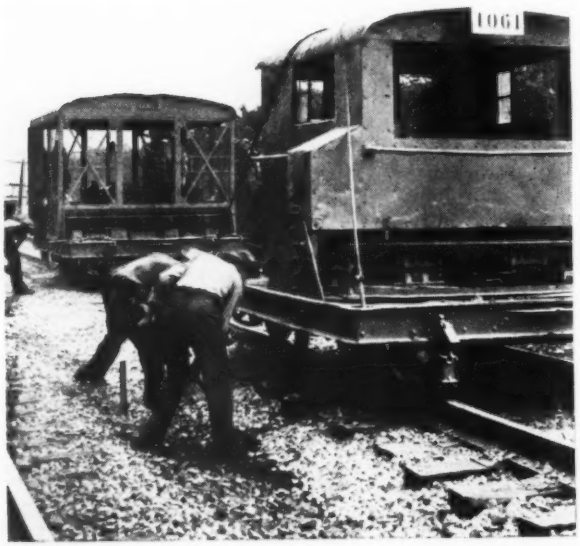
View of a Completed Section of Reballasted Track on the Pennsylvania's Bayard Cut-Off Near Rochester, Pa.



The Second Power Jack, Directed by a Foreman, Raised the Track Between Grade Stakes



Above—A 12-Man Gang Followed Close Behind the Power Jacks, Filling in the Cribs in Preparation for the Power Ballasting Machines



Left — Two Power Ballasters, Working About a Rail Apart, Tamped Each Tie to a Full Bearing. Tamping About Five Ties per Minute, These Machines Completed an Average of 2500 ft. of Track Daily

and follows the Ohio river through Wellsville, Ohio, to a point known as Yellow Creek. From Yellow Creek it cuts overland through Bayard, Ohio, and rejoins the main line at Fairhope, Ohio, 5 miles east of Canton, and 69 miles west of Rochester. The section between Rochester and Bayard, 55 miles, is a part of the original Cleveland & Pittsburgh railroad, and was built in 1852, while the remainder, from Bayard to Fairhope, was built in 1926.

For many years Pennsylvania freight trains moving between Pittsburgh and Chicago and other western points operated over the main line, a route that involved several relatively heavy grades between Rochester and Canton. This section of main line formerly embodied intermittent stretches of two, three and four tracks, but, when freight traffic was heavy, congestion developed at certain points. To relieve this situation, the double-track line connecting Bayard with the main line at Fairhope was built in 1926, and since then through freight trains have been routed by way of the cut-off, which has more favorable grades.

Heavy Tonnage

Through freight traffic over the cut-off has always been heavy, and during 1946 amounted to approximately 75 trains daily, the majority being preference trains, hauled by the latest types of Pennsylvania motive power. This heavy tonnage, in recent years, has been unusually hard on the track, and the maintenance forces have waged an almost endless struggle to maintain the line to the required standards.

The desirability of using stone ballast on this line had been considered by the Pennsylvania for some time, but, because of the difficulty experienced in obtaining labor in this district, during the war, the change-over was deferred. However, at a number of locations, where serious difficulty was experienced with track maintenance on cinder, particularly over soft subgrade, a three-inch bed of stone ballast was installed by hand to aid in holding the surface. This was done also through such cities as East Liverpool, Ohio, and Wellsville, to reduce the dust raised by trains.

In 1946 it was decided to proceed with a general rehabilitation of the line, installing stone ballast over the existing cinders and providing additional ballast at the locations where the approximate three-inch bed of stone had already been applied, thereby reducing routine maintenance costs, while increasing the efficiency of train operation.

In preparation for the actual work of reballasting, a profile was run of both tracks from Rochester westward, from which a new grade line was chosen and the exact amount of raise determined in advance. Grade stakes were then set at 50-ft. intervals along both tracks, using the outside rail on tangents and the low rail on curves as the grade rail. Where stone was to be used for the first time, an average raise of eight inches was planned. On the remainder, where stone ballast had already been installed, an average raise of six inches was prescribed. The ballast selected for the project is known as "Y" ballast and is from ¾ in. to 1¼ in. in size.

Temporary Crossovers

In the 1946 program, to insure the uninterrupted use of the track by the track forces, arrangements were made to route all trains over one track while the work of reballasting and raising was being carried out on the other. To facilitate such operation, temporary crossovers were installed midway between block stations, which on this line are located at intervals of 11 to 17 miles. During the working day, block operators were stationed at the temporary crossovers and trains were detoured around the point of work. All trains operated against the normal current of traffic were protected by train order. The work was progressed westward by sections, between block station and temporary crossover, first on one track, then the other.

Preparing the Track

Two 25-man gangs were used to prepare the track in advance of the ballasting. These forces renewed and spaced ties and, where necessary, regaged the track and cleaned cribs at muddy spots. In this work, in which approximately 500 new ties were required per mile, the track was given a light raise to facilitate tie renewals.

The tie-renewal gangs were followed by a work train, which unloaded a full section of ballast to the top of the rail. This train, which operated daily, included a Jordan spreader, and usually six to ten cars of ballast. After the ballast was unloaded, the spreader was used to distribute the stone or for ditching operations as required.

Raising and Tamping

The main raising and ballasting force, composed of 40 men, followed closely behind the ballast train. This force was divided into several gangs and was equipped with two Nordberg hydraulic jacks and two Power Ballasters, each pair of machines working in tandem.

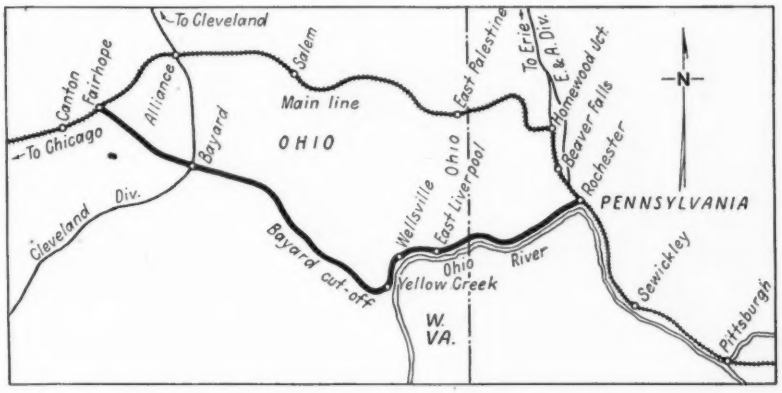
The power jacks were normally operated about 100 ft. apart, with the lead jack raising the track adjacent to each grade stake to the new grade, while the second jack raised the intermediate section. An operator and four laborers were assigned to each of the jacks, the laborers fork tamping the ends of the ties sufficiently to hold the track temporarily at the new grade. A 12-man gang followed directly behind the jacks, leveling the ballast from the tops of the ties and filling in the cribs in preparation for the tamping machines.

The two power ballasting machines were operated about one rail length apart, and about 100 ft. behind the power jacks, tamping each tie to a full bearing. These machines have a heavy crosshead member, with attached tamping bars, which is raised by a chain mechanism and is then allowed to fall by its own weight. Tamping is accomplished by the tamping bars, which are so arranged as to drive the ballast under adjacent ties. A gang of four men accompanied each of these machines, throwing loose ballast into the cribs as the tamping work proceeded. About six tamping blows were given at each tie and, working at the rate of about five ties a minute, the two tampers were able to complete an average of 2,500 ft. of track per working day.

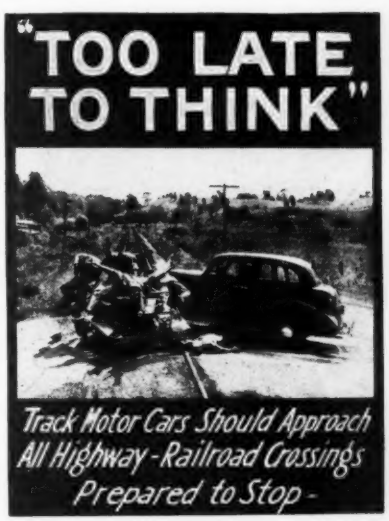
The final unit in the organization was a 10-man clean-up gang, lining the track, spot surfacing as required, dressing the ballast section and cleaning up the right of way.

Although the Bayard cut-off is given over almost entirely to freight traffic, all of the curves were stringlined as a part of the reballasting project. In conjunction with this reballasting work, the rail and the drainage conditions on the cut-off are being improved. For example, a considerable amount of 131-lb. rail, much of it cropped relay-rail released from main-line high speed track and new No. 2 rail, has been laid on this line, with the result that, as of the present time, there are 32.5 miles of 131-lb. rail in the eastward track and 14.7 miles in the westward track. The eastward track also includes 2.6 miles of 152-lb. rail. The remainder of the trackage on the cut-off, totaling 89.2 miles, is laid with 130-lb. P.S. rail.

The work described on the Bayard cut-off is being carried out under the general direction of G. A. Williams, engineer maintenance of way of the Eastern Ohio division, and A. H. Stimson, division engineer of the Eastern division, with headquarters at Pittsburgh, Pa. A. E. Himler, supervisor of track, whose headquarters are at Wellsville, Ohio, is in immediate charge of the reballasting work.

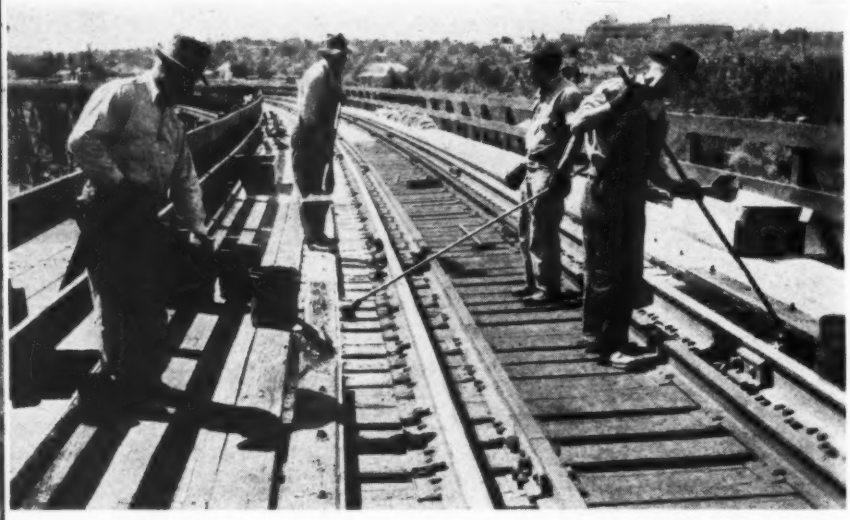


Map Showing the Location of the Bayard Cut-Off

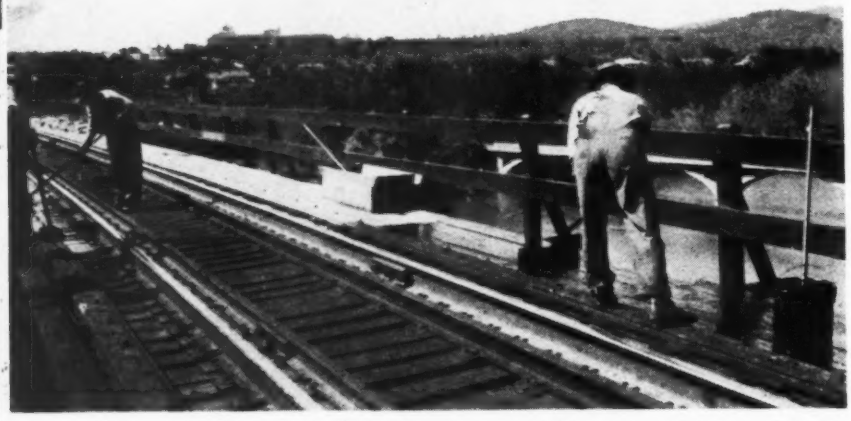


This Poster, No. 284, Constitutes Part of the "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

Fire-Retardant Coatings for Use on C



Applying Fire-Protective Coating to the Deck of the Southern Pacific's Viaduct Over the Sacramento River, Redding Cal. Man in Background Is Spreading Fine Stone Topping on the Deck Timbers



Above—After Being Applied by a Brush, the Asphaltic Compound Is Spread Evenly Over the Sidewalk Surfaces by Means of a Squeegee. Below—Moving the Coating Materials—Primer, Asphalt and Stone—Out on the Bridge With a Rail Dolly

DURING the last few years the Southern Pacific has experienced the loss of several small trestles and the serious damage of three or more bridges by fire. At most of these trestles and bridges, the decks, when the fires occurred, were protected by a coating of paint, sand, and cement, which had been applied separately—the sand and cement being thrown on the paint while wet. This protective coating has proved fairly resistant to fire for a short time after its application, but it soon wears down and cracks, exposing splintered wood where fires are apt to start.

We know that open-deck bridges are subject to ignition from several common causes, such as fiery brake shoe sparks or splinters; unextinguished materials tossed away by smokers, and oil, coal or other fuel dropped from locomotive fireboxes. Of these sources of ignition, the worst offenders, in my opinion, are brake shoe splinter or drippings of molten metal from overheated shoes, which not only set fires on bridges and trestles, but also to fields and forests.

Test Coats Applied

Although it is the present practice of the Southern Pacific, particularly on its main lines, to replace open-deck trestles, in so far as possible, with others of the ballast-deck type as rapidly as renewals are necessary, nevertheless, it still has many bridges of the former type to maintain and tests were undertaken to obtain a good fire-protective coating for them. Certain bridges in desert territories were selected for these tests, and one of the tests consisted of applying a hot application of a primer coat to the exposed wood surfaces, followed by an asphaltic compound coat containing gilsonite, and then adding finely crushed stone or pea gravel.

The compound coat was relatively thick, and the crushed stone, washed and from ⅛ to ¼ in. in size, sank into it while it was still hot. Enough crushed aggregate was applied to cover the asphalt coat completely, and, when cold, the asphalt coat held the stones firmly in place.

From the tests it was noted that as

Adapted from an address before the last annual convention of the Fire Protection and Insurance Section of the A.A.R. in Chicago.

Open-Deck Bridges

By U. S. ATTIX
General Fire Inspector, Southern Pacific Company
San Francisco, Cal.

Although it is the general practice of the Southern Pacific to replace its open-deck trestles with structures of the ballast-deck type when renewals are necessary, particularly on its main lines, this road still has to maintain many structures of the former type, with their attendant fire hazard. From its experience with open-deck trestles on mountainous grades, the Southern Pacific has found that most of the fires on these bridges have their origin in splinters from overheated brake shoes dropping on the timbers. To reduce this hazard it has adopted a practice of coating the exposed top surfaces of deck timbers with washed crushed stone held in place with an asphalt binder.

cracks and depressions formed in the wood surfaces, the resiliant protective coating would stretch over the cracks and sink into the low spots, without destroying its continuity. Impressed by these favorable results, many bridges and trestles on other divisions, under varying general weather conditions, were similarly treated, including the decks of two long steel viaducts, one 5,800 ft. long near Martinez, Cal., and the other, 4,350 ft. long, at Redding, Cal., where many fires had broken out previously from hot brake shoe splinters.

The accompanying illustrations show the application of the protective coating to the deck of the Redding viaduct. The storing and heating of the materials used on the structure were handled from one end of this bridge, rather than on it, to avoid the fire hazard produced in heating the asphalt material, which will burn when heated sufficiently. However, when filled and covered with small crushed stone, this material rapidly loses its volatile characteristic and becomes relatively hard.

Coating Restricts Fire

The ultimate fire-resistant characteristics of this material were verified by a laboratory test that we conducted on a sample board, given the same protective coating that is applied to our bridge decks. In this test, three 1¼-in. hexagonal nuts, heated to a temperature of 1700 deg. F., were placed on the protected board and allowed to cool until the incidental flame had disappeared. Following this, the first set of nuts was removed and a second set of similarly heated nuts was applied to the same points and allowed to stand until the flames they produced had disappeared and they became relatively cool. These nuts were then removed and the protective coating was scraped off so that the underlying wood could be examined. The examination disclosed only a small amount of char where the nuts had rested, and no spread of the flames beyond these areas was apparent.

A further test was made on this sample board with an ignited fusee that was allowed to burn itself out. Again, this coating showed its resistance to the spread of fire and, although the binder material did burn, the fire went out within a minute after the fusee ceased to burn. Shortly thereafter the coating material hardened in the area subjected to the burning fusee.

Fires on Treated Decks

Fires later developed on three bridges which had been given the protective coating and, although all of the fires were confined to the partial burning of one or two ties, we became much alarmed. Immediate investigations were made of these fires and we found that on two of the structures the fires started from sparks lodging in cracks about ⅛ in. wide between the ties and a ledger timber supporting the sidewalk. At one of these points the fire burned for about two hours before discovery, and at the other almost ten hours.

The fire that burned two hours was caused by a hot brake shoe splinter dropped from a train while descending the one per cent grade just north of Redding. The damage in this case was limited to the partial burning of two ties and the sidewalk ledger timber.

Fire Caused by Welder's Torch

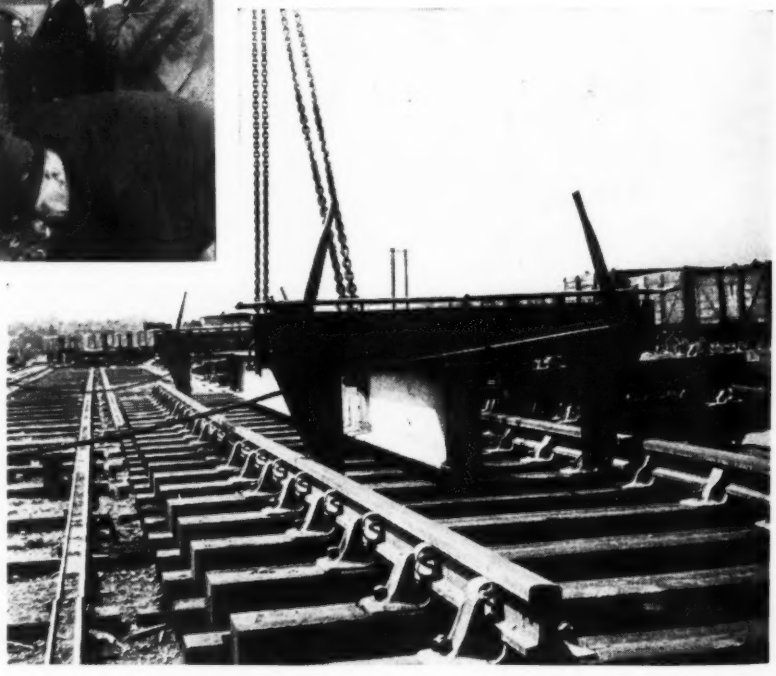
The fire that burned ten hours before discovery was found to have been caused by a spark from a welder's torch. In this instance the ties had been given the Burnett treatment and had been in service about eight years before the application of the protective coating. It seems that the original wood preservative treatment had leeched out of the ties under the weather conditions prevailing during those eight years and, when ignited,

(*Continued on page* 490)

Deck of the Sacramento River Viaduct After the Work of Applying the Fire-Protective Coating Had Been Finished

How One Road L

Pre-assembly of rails and ties into 60-ft. sections and their insertion as units reduces track occupancy and effects economies



(All photos courtesy The Southern Railway of England)

Above—After the Ballast Has Been Leveled, the New Section of Track is Lowered into Place and Coupled up. Right—Both the Old and New Panels are Handled With a Special Lifting Bail, Which Has Four Claws to Engage the Rails—Note Rail Chairs and Bullhead Rail Section

REDUCTION in the time required by the civil engineering department to carry out its work—such as relaying track—is of the greatest importance to those responsible for train operation on railways carrying heavy traffic. This is nowhere more true than in Britain, where the railway traffic average is the densest in the world. For example, the Southern Railway of England, smallest of the four main English systems, alone has a passenger traffic density equal to about 75 per cent of the total number of passengers carried by the Class I railways of the United States. Suburban service on the British railways is often operated at intervals as close as two minutes, and some of the main lines are signaled to accommodate trains at 60 or 70 m.p.h. on headways of as little as three minutes. Freight trains are usually operated at night to avoid interference with the frequent passenger service.

Anything, therefore, which can lessen the time required by the engineering department in relaying track is welcome, a fact that has led to the development on the Southern of a scheme of pre-assembled track laying in which 60-ft. panels, or sections, of track are fabricated and set into place as units. This method will be of special value in overcoming the deferred maintenance that occurred, unavoidably, during the war, and in regaining the high reputation for smooth running formerly enjoyed by the road. In common with other railways in Britain, most of the track mileage on this system is laid with bullhead rail (95 lb. per yd.), carried in cast-iron chairs on creosoted softwood sleepers (ties).

Track Is Surveyed

Before relaying is carried out at a particular location, the old track is surveyed to locate the precise position of each joint and the layout of track circuits, as well as to secure details concerning all physical obstructions, such as overhead bridges. A diagram is then prepared to show the new positions of the rail joints and the track-circuit bonding, together with quantities of materials. Such a survey is of special importance where 60-ft. rails are replacing 45-ft. or other lengths, and in advance planning for closures.

The assembly of the track begins at two main permanent-way depots where the chairs, which support the rail, are screwed to the sleepers. The sleepers are then shipped to one of six divisional depots where the work of pre-assembling the new track is completed.

Here the sleepers are laid out to correct spacing and the rails are lifted into position by a crane, employing a spreader bar to prevent distortion. This method of handling prevents damaging the rails com-

Lays Track in England

By CHARLES F. KLAPPER
Assistant Editor, "Modern Transport", London

pared with the practice of throwing them out of wagons (cars) onto the ballast as in conventional relaying. The 60-ft. sections of track are then loaded on a work train according to a pre-determined plan and, on the night when possession of the track is secured for the relaying operations, the work train is run out on one track and the work is carried out on the other.

Use Special Lifting Bails

Mobile cranes are used in the relaying work, each of which is equipped with a special lifting bail with four claws which engage the rails of the sections of track to be removed or of the new pre-assembled units. The ballast is leveled between the time of lifting out the old and laying down the new sections of track and, over electrified routes, the conductor rails (third rails) and insulators, which are located at one side, have to be considered. (The Southern Railway employs a 650-volt, direct-current, third-rail electric system, with running-rail return, on some 750 route-miles of line.)

After the new track is laid down and fished (bolted), and track-circuit and electric bonds added, it is lined and packed (tamped). The ballast train is then worked over it and the ballast is boxed up (shaped and dressed). The time for relaying a ⅜-mile stretch of track is approximately 4½ hr. as compared with a time of about 7 hr. with former orthodox methods.

The pre-assembled sections of track cannot be handled by cranes in tunnels, nor can they be handled easily in some cuts, with high retaining walls, or at overline bridgework. In the case of overhead bridges, if the bridge is not too wide, a possible means of working is to drag out panels of the old track to a point clear of the bridge, and then to load them separately. The new sections may then be handled into position in a similar manner.

Limiting Factors

One limiting factor in the method is that at least two tracks are needed. However, a method for renewing single-track sections of road is now under development. Curves cannot be relaid by the system if sharper than about 20 chains radius (4 deg.-20 min.) because all pre-fabricated track is made up straight. The fact that on many stretches of track only the rails or only the ties require renewal also reduces the usefulness of the pre-assembly method, but it is expected that it will be used on 50 per cent of the 130 miles of Southern track renewed each year.

Tidy Track

If it is found desirable, a second work train is operated on the old track to dispose of the old materials. Where this is the practice, the track is left extremely tidy and there are no old rails and sleepers left on the right of way for subsequent collection. Instead, the sections of track lifted out are removed to the proper divisional depot where they are dismantled and where all the parts are graded for re-use in main track, for use only in sidings, or for disposal as scrap. Unserviceable sleepers are used for firewood.

The rails to be used in future pre-assembled track are to be joined by means of a joint being developed on the Southern, with bars which provide a bearing surface, let into the faces of adjoining rails, across the joint, and which also act as fish-plates. This type joint results in extremely smooth running and longer life for the track.

Main depots for pre-assembled permanent-way work on the Southern are to be located at Redbridge, near Southampton, about 80 mi. southwest of London, and probably at Hoo Junction, near Gravesend, about 27 mi. east of the London terminus of Charing Cross. Plants for producing the scarfed ends of rails for the new joints will be set up as soon as possible at Redbridge.

The advantages of the pre-assembled renewal system, which has been developed under V. A. M. Robertson, chief civil engineer, Southern Railway, are manifold. From the standpoint of the traffic (operating) department, despite the fact that both tracks are occupied, the engineers' possession of the track becomes much shorter. From the engineers' standpoint, the system cuts down heavy manual effort and reduces the labor cost of the work. No men will be displaced by the adoption of the system. On the contrary, it will enable arrears to be overcome, as there is a continual shortage of permanent-way men in England. The Southern, for example, is short from 350 to 400 men in the London area alone.

Loading Old Track Panels Onto a Flat Car for Subsequent Dismantling in One of the Divisional Depots of the Road

over their schemes, the road selected the one with the plan that seemed most feasible. It was felt that by adopting this plan there would not only be a good possibility of returning the elevator to its upright position, but also of stabilizing the soil under its foundation at the same time. Under this plan, it was proposed to construct a reinforced concrete extension to the south side of the footing, thus providing greater leverage for lifting the structure than would be afforded by the existing footing, and then to inject cement grout at high pressure beneath the extension to furnish the necessary force to return the elevator to a vertical position.

Slab Anchored to Old Footing

In the design adopted, the extension slab was anchored firmly to the existing footing with 1⅛-in. and 1¼-in. square reinforcing bars, and with ¾-in. top and bottom stress rods attached to the bars in the old footing.

Constructing the Footing Extension. Some of the Heavy and Lighter Reinforcing Bars Have Not Yet Been Covered by the Concrete. Note Series of Vertical Grouting Pipes Projecting Down to the Gravel Mat

Maximum grouting pressure was computed at 250 p.s.i., acting upward against a transverse section of the slab, one foot wide, which was assumed to act as a uniformly-loaded cantilever. Computations for a slab six feet in width called for a maximum thickness of 33 in. at the outer edge of the footing extension. Here, the top was placed two feet lower than the top of the existing footing, and from this point the slab was sloped upward toward the structure to help offset the deflection that would be caused by the hydraulic pressure. To reduce the deflection of the slab further and to insure the transmission of the upward pressures to the structure itself, two buttresses were built between the top of the extension slab and the elevator wall at approximate third points of the slab.

Field Operations

The elevator proper was freed of encumbrances by chipping away all concrete of the attached buildings to a one-foot clearance and by cutting and bending back the reinforcing bars. Also, the workmen broke out a section of the concrete in the grain dump pit; partly excavated under the receiving pit; and moistened the soil under the north portion of the base slab to reduce its bearing power. The sloping concrete floors of the south bins, which had been previously emptied, were then cut away and the sand fill beneath them was excavated to bare the base slab of the elevator so that holes could be drilled through it for grouting operations.

The industry track was shifted away from the elevator and the footing was exposed by excavating around its south side and ends. With the critical point of the new footing extension the vertical plane where it abuts the old concrete, care was exercised to drill the holes for the new heavy horizontal reinforcing bars deep enough into the old base slab to insure a good bond. These holes, staggered on 9-in. centers in two lines 9 in. apart, were drilled with a jackhammer bit, 2½ in. in diameter, to a depth of as much as 20 ft. In addition, the old foundation reinforcing bars, which were ¾ in. square, were exposed by chipping away the concrete, and new ¾-in. round bars for the top and bottom stress rods were welded to them. The total reinforcing steel used in the footing extension slab and the two buttresses weighed almost ten tons.

Preliminary Work

Before this reinforcing steel was grouted in the prepared holes, a trench, about 12 in. wide and 2½ ft. deep, was dug around the edge of the excavated area. Also, a four-inch gravel mat was laid on the bottom of the new footing excavation and was topped with a very dry cement-mortar layer, about one inch thick. The purpose of the gravel mat was to form a porous strata which would later receive the initial injection of grout, and the mortar layer was to keep the porous mat from being fouled in the placing of the extension slab. After the mortar layer had hardened, the reinforcing bars were grouted in place in the old concrete and were shaped into their designed positions. Then, six vertical insert pipes, 1½ in. in diameter, were placed with their lower ends in the gravel strata. The new concrete for the footing extension was then placed in one continuous operation, using high-early-strength cement in a rich mix with six gallons of water per sack. The new slab, which was about six feet thick where it joined the old structure, required approximately 70 cu. yd. of concrete. The concrete placed in the surrounding trench previously described formed a wall to prevent leakage of the grout to be injected at high pressure in later operations. The buttress walls were then constructed.

Tests of Concrete and Bonding

Test cylinders were taken of the new concrete at one-hour intervals while being placed and were tested at the 7, 14, 18, and 21-day stages. Also, a bonding strength test was made for the 1¼-in. steel bars by taking a sample block, 12 in. square, from the old concrete of the foundation, drilling a hole two inches in diameter and six inches deep in it, grouting in a short piece of the reinforcing bar, and later testing it in tension. All tests proved satisfactory.

With the concrete placed and hardened in the footing extension and buttress walls, the contractor had completed the work preliminary to the lifting of the elevator by high-pressure grouting. He now had a structure freed from all encumbrances that might hinder it from being straightened; a substantial lever on the south side of its base in the form of the footing extension; a porous strata beneath the extension reached by pipes for the application of the initial force; and a fulcrum established by the earth under the central portion of the foundation, the soil under the north side of the elevator having been softened by the moistening.

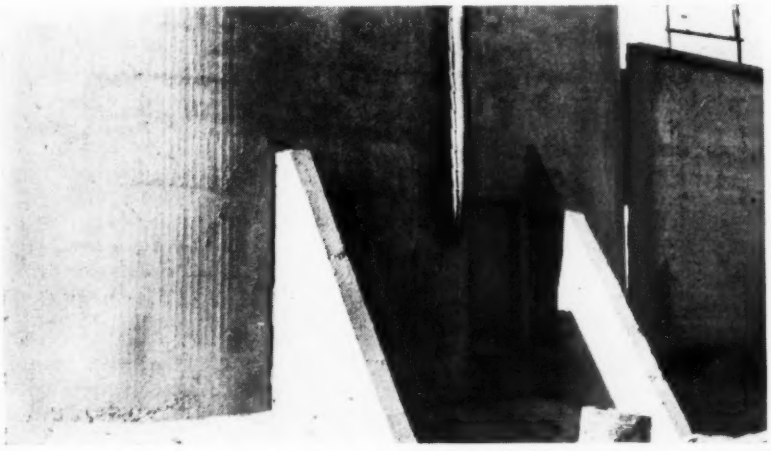
Grouting Operations

The grouting operations were relatively simple. The grout mixing-and-pumping plant was set up about 50 ft. from two of the six injecting pipes, to which standard insert fittings and valves had been attached, and was connected to them by special high-pressure hoses. Two or more holes were pumped simultaneously at locations selected to obtain the best grout spread and thereby the maximum leverage. All valves on pipes not being pumped were left open to disclose the extent of the grout spread, but were

closed immediately when grout was observed flowing from them. Pumping continued until grout had been injected into all of the six injecting pipes, and, with the completion of the first day's pumping the top of the elevator had straightened back 11 in.

Grout Hardened Quickly

Since the cement grout, especially under the high pressure used, hardened quickly, the six injecting pipes were rendered useless for pumping operations for the succeeding day and were cut off close to the top of the extension slab. For the next and later stages of pumping, new holes had to be drilled through the slab, as well as in the foundation slab within the south bins of the elevator. These holes were drilled on about eight-foot centers to the underlying soil, where they were jetted down a little further by blowing out some of the finer soil, using blow pipes to form a small pocket. The purpose of the pockets was to afford starting places for the pressure of the grout to be exerted, and subsequently to expand, as it did, in a thin layer immediately under the slab. Standard inserts were fitted in the holes as drilled, and the assembly was then air-tested before grouting.



Two Buttress Walls Were Built to Aid in Transmitting the Footing Extension Raise to the Elevator and Were Removed When the Work Was Completed

One-Day Interval Between Stages

Generally, one day was required between pumping stages for preparing the holes for the next grouting operation. Since each succeeding underlying layer of cement grout added to the depth of the hole to be drilled, the time required for this preparation increased slightly for later operations. (In the last phase of this work, the holes had to be drilled 14 ft. in some places to penetrate through the slab.)

Pumping started May 15 and was completed on May 25; during this time, five days were spent for pumping.

Lift Was Not Gradual

The pumping pressure usually registered 100 p.s.i. on the gage at the start of a pumping operation. As the voids filled up with grout and the underlying soil compacted, the pressure gradually built up to about 350 p.s.i., at which point it would drop, which was an indication that either the structure had been raised or the grout had found an escape.

The raises of the structure came spasmodically and were not in a continuous movement. The first raise of each day of pumping came only after several hours of pumping, whereas, following raises on the same day came at closer intervals. More specifically, with pumping operations starting about 8 a.m., the first raise did not take place until about 11:30 a.m., whereas succeeding raises followed at half-hour to hourly intervals, until pumping ceased for the day.

Reasons for Long Pumping Periods

It was presumed that the longer period of pumping for effecting the initial raise of the day was due to several reasons. Undoubtedly, the new grout had to compress the soil further at the injection area, which was then the greatest point of compression, and knife its way inwardly between the soil and the lowest previously-placed, and now hardened, grout layer before hydraulic compression could be exerted with ample force to raise the weighty structure. On the other hand, an explanation of why the succeeding raises were effected at closer intervals is that since the grout was still in a plastic condition, it flowed readily by continuous pumping into the void as created, and some hydraulic pressure could be exerted constantly without the necessity of forming another layer of grout.

Continuous Pumping

It was found that continuous pumping was of the utmost importance in keeping the grout holes open. This was demonstrated on one occasion when an air pocket in the line, caused by allowing the grout intake at the pump to become empty, resulted in a closed hole.

No re-settlement of the elevator, or movement contrary to the lift, was noted after a raise occurred or after the pumping was stopped, or even from one day to the next. However, care was exercised to prevent such an occurrence by thickening the grout, together with the judicious use of admixtures, which controlled the time of the initial set, and by holding all back-pressures, which were found to be tremendous. In one instance, when a valve was opened at one of the inserts, the grout shot upward as high as 50 ft.

The sequence of pumping operations was continued until the elevator had been completely restored to vertical. A transit was used throughout the pumping operations to observe any movement of the structure.

Equipment and Material

The plant used for the grout pumping consisted of two gasoline-driven air compressors, two grout pumps, an air-operated double mixer, an air-driven water pump, and the necessary high and low-pressure hoses for grout and water lines, together with the inserts for connecting hoses to grout holes. The air compressors, each having a capacity of 210 cu. ft. per min., furnished the power for all of the equipment. Water was taken from two nearby wells and the water pump acted as a booster.

A special manifold connection with valves was attached to each of the grout pumps and a high-pressure

grout hose was connected to each of the valves. Thus, several separate grout lines were available, with at least two always in operation during pumping operations. This arrangement speeded up the work considerably, because while two of the lines were being used, the other lines could be removed and attached to the inserts next in line to be pumped.

The one double mixer furnished all of the grout needed for this work, which generally amounted to about 15 batches an hour, but which at times amounted to as much as 40 batches an hour. Although the mix was varied to suit conditions, each batch usually consisted of two bags of portland cement, one bag of grout filler and 14 gal. of water, plus about three pounds each of two admixtures, as deemed necessary. No sand was used. Grouting operations required a total of 1,504 sacks of cement and 1,019 sacks of filler.

When the raising work had been completed, the contractor repaired the pump pit and the roofs and walls of the adjoining buildings; restored the sand fill in the south bins and replaced their bottom slabs; and removed the two buttress walls; following which the elevator was restored to full use.

The grouting method and special admixture used on this project were developed and patented by Intrusion Prepakt, Inc., Chicago, which did the work under contract, the plan having been approved by W. E. Heimerdinger, acting assistant chief engineer of the Rock Island, while S. T. Robinson, division engineer, acted for the railway interests in the field. General direction of the work was by Raymond Patterson, regional vice-president of Intrusion-Prepakt, Inc., while field operations were carried out by Victor Erickson, superintendent.

Fire-Retardant Coatings for Bridges

(Continued from page 483)

the wood smoldered like a piece of punk, never bursting into flame.

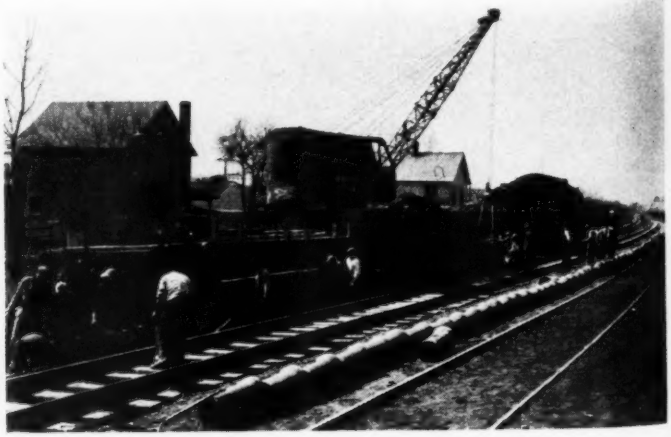
The third fire referred to was caused by hot ashes thrown from a diner and scattered over 600 ft. of the bridge, resulting notably in only one fire. Although checkered steel plates had been applied over the sidewalk of this bridge, glowing coals in the ashes lodged in small cracks in the untreated ends of the ignited ties and, fanned by strong cross winds, set fire to the wood under the plates and the protective surface coat, and burned for three hours before discovery.

Further Tests Made

Following these three bridge fires, we made further tests by applying hot pieces of metal and lighted fusees to the surfaces of similarly coated timber, making the tests both in and out of doors. In one of these experiments, the coated surfaces of two planks, placed face to face, were subjected to the flame of a fusee that was directed between them. In this instance the edges of the planks, which had been treated with the asphalt binder but not covered with the crushed stone, were ignited by the flame and burned for three minutes after the fusee was out, charring the wood to a depth of about ¾ in. When the planks were separated and their surfaces examined, it was noted that, while the protective coating directly subjected to the flames had melted for a distance of approximately ½ in., the surfaces beyond that point were in perfect condition.

Advantages

After thoroughly studying the results of the bridge fires and considering the results of the tests, we feel confident that the protective coating described offers considerable resistance to fires at their incipiency and is a distinct aid in preventing the spread of fires once started. Furthermore, we are of the opinion that, under normal operations, fires will not be started by hot brake shoe splinters or fusees on bridge decks treated as described, unless such igniters happen to come in contact with untreated surfaces. Therefore, we are continuing our practice of coating all exposed surfaces on open-deck trestles and bridges in this manner in the hope of preventing fires on such structures.



Installing Clay Pipe for Drainage

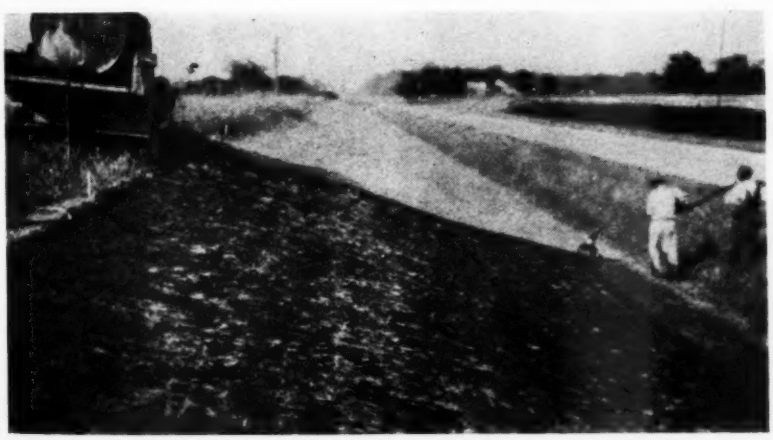
***RECENTLY** the Baltimore & Ohio installed a roadbed drainage system along its main line at Rittman, Ohio, which involved the use of clay pipe placed in trenches that were backfilled with crushed stone. For this installation the railroad specified the new A.S.T.M.-C-200 extra-strength clay pipe. In the view above, a work train is excavating a trench between tracks, into which the clay pipe is being placed. At the left is a close-up view of a section of the open trench with the clay pipe in place and partially surrounded and covered by the stone backfilling.*

A New Way to Stop Erosion

This article is adapted from one written by Fred R. Bruto, roadside engineer, Missouri state highway department, and published in a recent issue of The Highway Magazine. In it Mr. Bruto describes a new development in the sodding of slopes with desirable grasses by means of an asphalt cover which is applied after the prepared surface has been seeded. So far, this method has been followed only experimentally on highways. It should be of interest to the railways, however, especially where they are grading the right of way to provide better drainage and a smooth surface for the operation of mowing machines.

ESTABLISHMENT of a growth of vegetation suitable as a cover for earth surfaces subject to erosion is the most effective, the most satisfactory and, at the same time, the least expensive way to control the tendency toward erosion. This may be accomplished in several ways—by seeding or sodding grasses, by planting vines or other ground-covering plants, or by planting woody shrubs and trees.

All seeding and planting operations depend to a large extent for their success upon a satisfactory control of soil moisture, to insure the establishment of the plants. The most effective means for controlling soil moisture for seeding operations on roadsides is the use of a mulch, that is, by covering the seeded area with straw, hay or similar material to a depth that is sufficient to retard the evaporation of soil moisture, yet not deep enough to prevent the emergence and growth of the grass.



Above—Applying Asphalt Cut Back with Kerosene to Prepared Slopes Near Advance, Mo. Right—The same Slope Five Months Later

While the use of straw, hay and vegetable litter of various kinds is the accepted and recommended mulch for highway roadside work, there are disadvantages in the use of these materials. One of the most common occurrences is the loss of the mulch by fire and the consequent damage to the seedlings. On the railways this hazard might be increased considerably by the possibility of falling locomotive sparks. Again, on steep slopes, the straw and similar materials tend to shift downhill and are subject to movement by wind.

In certain sections of Missouri, the fact that neither straw nor hay is available in large quantities, except at prohibitive prices, has led the highway department to consider the possibility of using other materials as mulching agents. Among those that have been investigated is a cut-back asphalt designed to be used as a mulch. To date, the use of asphalt mulch on seeding operations looks very promising, especially on shoulders where there is always a definite fire hazard.

In 1941, H. E. Meyers and R. I. Throckmorton, of the Kansas Agricultural Experiment Station, Manhattan, Kan., prepared an article entitled Some Experiences With Asphalt in the Establishment of Grasses and Legumes for Erosion Control, which was published in Vol. 6, Proceedings for 1941, Soil Science of America.

Experimental Work

The experimental work upon which this paper was based was initiated and carried to a surprisingly successful conclusion at the insistence of Rollin J. Smith, asphalt engineer, Skelly Oil Company, Kansas City, Mo., and erstwhile engineer of highway construction in the Kansas state highway department. Mr. Smith now holds the patents on any process which uses asphaltic materials for establishing grasses.

Meyers and Throckmorton found from their studies that it was possible to establish good stands of grasses and legumes from seed placed under a mulch of asphalt. To do this, however, the asphalt had to be of a special type that would dry and harden quickly. They also found that water penetrated through the asphalt readily, and that the special asphalt gave reasonably good erosion control for at least one year.

Later Experiments

Later experiments by Mr. Smith in the use of an asphalt mulch on seeding operations indicated that such treatment will give good erosion control, even after the grass is established, although the material disintegrated eventually and became incorporated into the soil.

The Missouri state highway department placed a series of test sections at three different sites, in 1945, using asphalt as a mulch on newly-seeded areas. The asphalt used in these tests was supplied by the Lion Oil Company, El Dorado, Ark., and is known as "soil paint" or "soil cut-back." This material is described as an asphalt cut back with kerosene. The base is an air-blown, straight-reduced penetration asphalt, and the solvent is a treated straight-run kerosene. The cut-back material did not, therefore, contain cracked fractions. The kerosene had to be processed until a product was found that was non-toxic to young plants, since the emergence of young plants occurs before all of the solvent has evaporated.

Non-Toxic Solvent Developed

Dr. A. J. Hoiberg, director of asphalt research, Lion Oil Company, was successful in designing a solvent which was non-toxic to plants under certain conditions, and an asphaltic base which dried rapidly and remained brittle under all atmospheric conditions. When applied at the rate of about 0.2 gal. per sq. yd., this material penetrated the soil to a depth of about ¼ in.

Subsequent cracking and perforating allowed the young plants to emerge through the asphalt film, while the low-penetration property of the asphalt permitted the coating to crumble after several weeks. As a result, the reseeding and the rooting of runners above ground took place without difficulty. Considerable research, including a series of greenhouse trials, was necessary before the final product was approved for use.

These test plots were seeded late in the season because the highway department was also trying to evaluate the degree of success and failure in seeding roadsides out of season. Many of the seeds thus sown did not germinate until the September rains set in, and some of the grasses that did not show up very well at the start are now making their appearance through the asphalt-treated sections.

Where the Test Plots Were

At Advance, Mo., where one series of test plots was located, both the seed and the cut-back asphalt were applied on March 31, 1945. Check plots were mulched with straw and sawdust. Observations made one month after seeding found the entire area green with young seedlings, mostly clovers and Bermuda grass.

Successful establishment of Bermuda grass from seed in Missouri has generally been considered impractical, and the accepted practice has been to use cuttings with roots instead of seed. Since asphalt mulch is known to increase soil temperatures by as much as 10 to 15 deg. under direct exposure to sunlight, it was believed to be likely that the seed of Bermuda grass would germinate better under asphalt than in open soil. That this supposition was correct is indicated by the excellent stands of Bermuda grass grown from the seed which are to be found in the test plots which were mulched with cut-back asphalt.

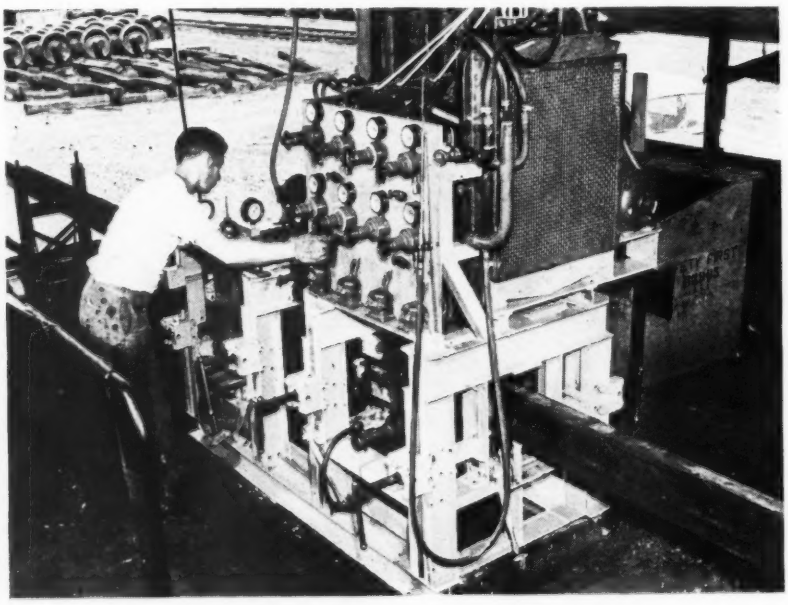
Other grasses and legumes which gave favorable results under asphalt were Korean lespedeza, alfalfa, yellow and white sweet clover, crab grass, foxtail, alta fescue, meadow fescue, switchgrass, red clover, crimson clover, white dutch clover, alsike clover, ladino clover and low hop clover. Also—smooth brome grass, downy brome orcheat, orchard grass, meadow oat grass, red top, timothy, bluegrass and purple vetch.

Other Test Plots

Similar test plots at Dutch Town, Mo., were seeded on June 26, 1945, the asphalt being applied at the rate of 0.4 gal. per sq. yd. Others, at Springfield, Mo., were seeded on July 24, 1945, and the asphalt was applied at rates of 0.2 and 0.4 gal. per sq. yd., on July 27.

Areas mulched with asphalt are generally freer of weeds than areas mulched with straw. Asphalt can be applied by machine methods, eliminating hand labor, but the placing of a straw mulch requires hand labor.

Asphalt is readily available and has further advantages in that it can be stored and used when needed. The rate of application is 1,000 gal. an acre.



Improved Oxweld Rail Welding Machine

THE OXWELD Railroad Service Company, Chicago, has recently made a number of important improvements in its oxyacetylene pressure-welding machines for producing continuous rail. The latest model of these machines has electrically-operated circulating water pumps, improved rail aligning devices, and hydraulic clamps. In addition, the machines are said to be 4,000 lb. lighter than earlier models, making them more easily transportable to and from the site of the welding operation.

Fractures from Wheel Burns Cause Derailment

TWO detail fractures, which developed immediately below rail burns made by the slipping of driving wheels, caused a derailment on December 27, 1946, of the Illinois Central's southbound Panama Limited, and resulted in the injury of 48 persons, according to the report of an investigation of this accident by the Interstate Commerce Commission. The following information is abstracted from the commission's report.

The accident occurred near Ruddock, La., about thirty miles north of New Orleans, on the main line of the Illinois Central. The road in this territory is double tracked and trains are operated by timetable, train orders and an automatic block-signal system. The derailment occurred on a tangent approximately five miles long on which the grade is level.

The track structure of the southward track, on which the accident occurred, consists of 90-lb. rail, 39 ft. in length, laid new in 1925 on 24 ties to the rail length. It is fully tie-plated, single spiked, and is provided with 4-hole angle bars, 24 in. in length, and an average of 10 rail anchors per rail length. The track is ballasted with slag to a depth of 12 in. A continuously-lighted automatic signal of the color-light type, governing southward movements on this track, is located 1.21 miles north of the point of accident. The maximum authorized speed for passenger trains in this territory is 60 m.p.h.

Train No. 5, The Panama Limited, consisting of two Diesel-electric units and 13 cars, passed the last open office, known as Manchac, 5.53 miles north of the point of accident, at 8:34 a.m. As it approached the automatic signal previously referred to, it received a proceed indication and shortly thereafter, while moving at a speed of 60 m.p.h., the rear truck of the eighth car and the following cars in the train were derailed.

Separations occurred between the first and second cars immediately after the derailment and also occurred between the fifth and sixth cars and the eighth and ninth cars. The ninth to the thirteenth cars inclusive were considerably damaged, the eighth car was slightly damaged. Forty-four passengers and four dining car employees were injured.

After the accident a broken rail was found on the west side of the southward main track. This rail was broken at two places 5 ft. 5½ in. apart. The first break occurred between two ties at a point 31 ft. 9 in. south of the receiving end of the rail. The second break also occurred between two ties. The adjacent ends of the sections of rail at the first break were considerably battered, and the receiving end of the third piece of rail, south of the second break, was battered downward about 15 deg. Flange marks appeared on the west side of the web of the piece of rail extending between breaks 1 and 2.

Progressive detail fractures covering about 50 per cent of the cross section of the head of the rail were found at both breaks. The metal at these areas was darkened by oxidation, indicating that the rail had been defective for some time prior to the accident. The remainder of the breaks through the head, web and base of the rail were new. In both cases the breaks through the head of the rail were square but were slightly angular through the remainder of the rail.

Both fractures occurred beneath rail burns caused by the slipping of driving wheels. At these points the top surface of the rail had shelled out, and the detail fractures had progressed downward in the head.

About fourteen minutes before this derailment occurred, another southbound passenger train passed over this track without incident. Since the automatic block signal north of the point of derailment displayed proceed for train No. 5, it was concluded that the complete failure of the rail occurred when the front section of the train passed over it, after which the piece between the breaks became displaced and the general derailment followed. A rail-flaw detector car was operated over this territory on October 2, 1946, but failed to disclose any defect existing in the rail.

Radiant Heat Keeps Rails Free of Ice and Snow

***RESULTS** of the application of the principle of radiant heating to the tracks in car storage yards to keep them free of ice and snow are illustrated in this photograph, taken during a heavy snowfall last winter at the Olyphant colliery of the Hudson Coal Company, Scranton, Pa. The protection provided, which covers 2,700 ft. of rail and numerous frogs and switches, involves the use of 5,500 ft. of "Rayduct," Bethlehem Steel Company's radiant heating pipe, which is fastened directly to the rails. Steam is the heating element employed. During the two winters that the system has been in operation it is reported that the rails have been kept free of snow, and that the consumption of steam has been reduced as compared with the system formerly used in which a 1½-in. pipe was laid on the ties between the rails. A brief description of the constructional details of this installation appeared in the December, 1946, issue, page 1305.*

What's the ANSWER?

Relaying Second-Hand Rail

Should second-hand rail that has been removed from tangent track be turned when it is relaid? Why? Does cropping make any difference? Why?

Opinions Differ

By J. E. FANNING
Assistant to Chief Engineer, Illinois Central, Chicago

Instructions have been issued by individual railroads and a number of articles have been written dealing with the manner in which new rail should be laid, but although there is a general understanding as to certain precautions that should be taken when second-hand rail is being applied, I do not recall any specific discussion on the subject. I am confident, however, that there is a difference of opinion among track men on the question of turning second-hand rail which has been relieved from tangent track.

I am informed that it was the general practice some years ago to turn such rail, the idea being that added life would be obtained by placing the unworn portion of the head section on the gage side. This was at a time when most of the second-hand rail was being laid on branch lines where the power and tonnage were light. The result, under those circumstances, was not altogether unsatisfactory.

However, with the advent of heavier power and the more extensive use of second-hand rail in heavy freight lines and yards, fillet cracks and other defects were discovered which were attributed, primarily, to the change of wheel bearing on the rail head. The result has been that many roads have since adopted the policy of applying second-hand rail without turning it, although others still prefer that it be turned. It should be understood that the rail under discussion is that removed from tangent track and not sufficiently worn to cause any trouble from wheel flanges coming in contact with the angle bars.

The decision as to whether individual rails should be turned depends upon their condition, but in my opinion, longer life will be obtained, and less difficulty will be experienced in maintaining good line and gage if second-hand rail is relaid without turning it. I do not think the cropping of rail has any bearing on which way the rail should be turned.

Better Results if Turned

By ROADMASTER

For many years on our railroad, we have found it economical to recover good second-hand rail from our high-speed lines before the fishing angles at the ends are seriously worn. Before the joint conditions become unsatisfactory in many locations the rail may have acquired slight surface or line defects that might cause rather unpleasant riding conditions at very high speeds.

Such rail is removed from high-speed territory and laid in mountainous territory where speeds are low and curves are many. It has been found by long experience that better results are secured by turning the old gage side of the rail outward. There is a pronounced cold-rolled surface on the head of such rail, and usually it is found that there has been a slight surface flow of metal from the gage to the outside of the rail. If the old gage side of the rail is placed inward, the flow of metal on the head of the relaid rail will be in the same direction as it was when under high-speed traffic, and much of the benefits of the cold-rolled surface will be lost. This loss in wearing qualities will be very noticeable on the outside of curves

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In July

1. *What satisfactory methods can be employed to drain or otherwise stabilize the track at highway crossings at grade? What are their relative advantages?*
2. *What type structure is best adapted to the needs arising from the use of the more recently developed types of communication, such as talk-back loud-speaker systems, space radio, etc.? What special features should these structures possess? Why?*
3. *When necessary to work around derailed or leaking cars containing gasoline or other inflammable commodities, what special measures or precautions should be taken?*
4. *What considerations determine when a wire rope should be discarded? Does the size of the rope or the service in which it is being used make any difference?*
5. *What, if any, special tools are required or desirable for the installation and maintenance of turnouts? Why? Do interlocked switches require different tools?*
6. *What procedure should be followed in packing reciprocating pumps? What kind of packing should be used for hot water? For cold?*
7. *Should crossties be uniformly spaced without regard to joint locations, or should spacing be altered at joints to provide either suspended or supported rail ends? Why?*
8. *What kind of flooring should be used in a car-wheel shop? Why? Can concrete be used? If so, how can it be processed to protect it from damage or undue wear?*

and the flow of metal on the inside of curves may soon show up in corrugations in the surface. Neither of these will obtain when the rail is turned.

We endeavor to get our good relayer rail from high-speed tracks for use on low-speed or branch-line tracks before the fishing angles become worn to such an extent that cropping is necessary.

Turns When Worn Unevenly

By J. G. Wishart
Principal Assistant Engineer, Chicago, Rock Island & Pacific, Chicago

Second-hand rail that has been removed from tangent track, and classified as fit for relaying in main track, as a general rule need not be turned when relaid. There are occasional cases, however, when unusual conditions may have caused the rail to wear slightly irregularly or become beaded on the gage side while the outside has remained without wear or deformation. Such rail should be turned when relaid to produce a uniform gage line and a full section of rail head to resist flange wear.

Cropping would have no effect on the turning of the rail. The principal benefit from cropping is the elimination of battered, bent or drooping rail ends, none of which can be remedied by turning.

Turning Gives Better Line

By Roadmaster

When second-hand rail that has been removed from tangent track is relaid, it would be better to turn the rail end for end in order to obtain a new gage line, as even on tangent track the rail wears unevenly and irregularities develop. If the rail is turned these spots have no effect and a new, uniform gage line is produced. Cropping would make no difference in deciding whether to turn the rail as the spots where uneven wear has occurred are not always at joints.

Rides Better if Unturned

By B. R. Meyers
Assistant to Chief Engineer, Chicago & North Western, Chicago

In most cases, second-hand rail from tangent track is relaid on lines with lighter power, lower-speed trains, and less traffic density. With this in mind, the condition of the rail would govern how it should be relaid. If rail has only a moderate amount of wear, I would relay it the same way it came out of track, because it is my opinion that better-riding track will result if rail is not turned. Furthermore, there would probably be fewer joints to match up by welding than there would be if the rail were turned. If the rail had considerable wear, then I think it should be turned when it is relaid to get the thickest portion of the head on the new gage side, and thus provide the longest possible wearing life. Only rail in good condition should be relaid on heavy-power lines, and it should not be turned. If the head is badly worn, the rail is only suitable for side, station, yard or other secondary tracks.

The matter of cropping rail before relaying is an independent problem and does not affect the manner in which usable rail should be relaid.

Modernizing Small Stations

To what extent should old, small and moderate-size stations be modernized? What factors should be considered? Should the work be left solely to local building forces? If so, why?

Extent Depends On Revenue

By A. H. Simon
Engineer of Buildings, Chicago, Burlington & Quincy, Chicago

In most cases, the extent of modernization will depend upon the revenue derived. In a location where the revenue is small and the depot is in poor condition, we recommend repairing it so it will be serviceable and have a reasonably good appearance. Often, it may be found that the size of such a building may be reduced. No modernization program should be undertaken without the benefit of instruction from the engineer of buildings who will decide to what extent modernization will be economical.

Old Stations Too Big

By Engineer of Buildings

Most old stations were built when horses or mules provided the principal method of highway approach to them, and are about as outmoded as the hitching posts which then obtained on the station grounds. Furthermore, on account of the slowness or uncertainty of communications on highway transportation, these old station buildings usually contained large warehouse space which is no longer needed. Often very little consideration was given to proper lighting.

The maintenance expense of these older structures is often so large that it is economical to reduce their size or replace them with well-lighted, well-ventilated, well-planned and adequately-equipped buildings. Painting costs alone have tripled or quadrupled since many of these structures were built, and in many instances justify modernization without regard to any other factors.

Where station buildings are standardized, there is no reason why modern mills should not turn out all millwork required, so that it can be put together by the local building forces on suitable foundations which they have built previously. There is an advantage in having local forces do the work of modernizing old stations in that all are not done at once, and the salvaged portions of one station may be used to repair a similar building so as to keep it serviceable until it can be modernized.

Consider Overall Policy

By L. E. Peyser
Assistant Architect, Southern Pacific, San Francisco, Cal.

In considering the desirability of remodeling or modernizing old, small or moderate-size stations, several factors must be considered.

(1) Is the present structure in such physical condition that improvements can be made without too large an expenditure for the replacement of basic structural parts? If not, it should be maintained until a new building is justified.

(2) Does the station serve a rapidly growing community that might require a considerably larger facility within a relatively short time? If this is the case, then a minimum amount of improvement work should be done, pending the construction of a larger

building. Conversely, if the traffic potential is decreasing, consideration should be given to reducing the size of the structure, thereby effecting lower maintenance costs, and modernizing the remaining portion of the building.

In all cases the question should be considered on two general bases: (1) Whether to improve both the appearance and the operating conditions, or (2) to remodel solely for the purpose of increasing efficiency, without considering looks. Other factors, such as public demand or local civic pride must also be considered carefully.

No work of this character, regardless of how small its extent, should be left to the local building forces who may not be in a position to know exactly what policy to follow, or what the managements' intentions for the future may be. Each case, instead, should be developed by the officers in charge of such work so as to conform to an overall program.

Generally, if the present structure is sound, large enough to meet local requirements, and is characteristic of the type that will lend itself to modernization, it would be economical to spend a considerable amount for modernization, because such work, if undertaken in time to forestall public demand for a new structure, will make unnecessary the expenditure of a larger sum for an entirely new facility where it is not needed.

Supplying Concrete Mixers

Is there any advantage in equipping regular bridge and building gangs with concrete mixers? If so, of what capacity? What type mounting? If not, how can the necessary concrete work on small jobs be done?

Small Mixers Beneficial

By W. C. Harmon
Bridge and Building Supervisor, Southern Pacific, San Francisco, Cal.

Every bridge and building gang should have a small concrete mixer of approximately ⅛-yd. capacity as part of the gang's equipment. There should also be a ¼-yd. mixer furnished for the use of every four gangs of the average size, who have the usual assignments of such gangs. One or two ½-yd. mixers on a division is usually sufficient. In rare instances a 1-yd. mixer is required.

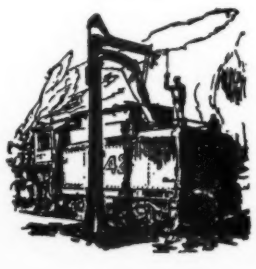
The smaller mixers should be mounted on steel wheels, except those which are to be used in cities or towns where truck service is available for towing purposes. Then they should have rubber-tired wheels to comply with the ordinances. Except in these instances, there is little reason for having wheels on the larger mixers at all. Where it is necessary to ship the equipment by train and unload it from cars, good skids are handier and less hazardous than wheels in moving it. Of course, there are exceptions. Rubber wheels have few advantages on the line, and because this equipment must be left out unprotected such wheels may be stolen.

Every gang has a certain amount of concrete work to do. Some jobs are large, some are small; but the majority of this work can be handled with a ⅛-yd. mixer. Furthermore, the foreman will use a machine of that size when he would not go to the trouble to unload and transport a big, bulky ¼-yd. machine a mile or two by push car. My experience has shown that many foremen would rather mix concrete by hand than perform such a hazardous and arduous task.

We believe that concrete should be mixed by machine, and that hand-mixed concrete should be discouraged for the reason that it is not uniform, and has few, if any, of the other qualities possessed by satisfactory concrete. For that reason we should make it possible to get the best mix at the least expense by supplying the proper tools.

Although these small machines are comparatively inexpensive, they seem to wear out faster than the larger ones, and for that reason each gang should have one which it does not have to share with other gangs.

The ⅛-yd. mixer is not efficient for jobs requiring more than 25 yd. of concrete. For more extensive work a ¼-yd. mixer should be used to avoid the loss of time in charging, mixing and delivering small batches to the forms. But this size has a limit, too, beyond which its efficiency also drops. There are many instances where it is necessary to make continuous pours within time limits, such as on seawalls and similar work, where mixers of ½-yd. and larger are required.



When planning to provide concrete mixers, I believe consideration should be given to all of these points, but principally to the quantity of concrete to be poured on the majority of jobs. In addition, one should not overlook the ready-mix plants in the neighborhood of the work, for they can deliver concrete to the forms as cheaply as it can be mixed on the ground.

Uses Pre-Mixed Concrete

By General Supervisor Bridges and Buildings

On my territory it is possible, to a large extent at least, to secure pre-mixed concrete expeditiously from outside firms for delivery to our prepared forms wherever needed. Therefore we do not equip our regular bridge and building gangs with concrete mixers.

However, where a smaller amount may be needed than will justify the delivery of pre-mixed concrete, we use a small gasoline-driven mixer that mixes it on the job. This mixer is not assigned to any regular gang, but is kept at headquarters and transferred by truck to points where its use will prove economical. We have it mounted on rubber-tired wheels in order that it may be run into places which are inaccessible to trucks. For very small jobs where the cost of using the small mixer is prohibitive, we mix our concrete by hand.

Regular Gangs Need Them

By Bridge and Building Supervisor

There are decided advantages in equipping bridge and building gangs with concrete mixers. The more important of these are: (1) A better concrete is produced; (2) the use of a mixer relieves the men of a lot of laborious hand labor; (3) the concrete is more easily handled, as it can be delivered directly to barrows or buggies for transportation to the job without rehandling; and (4) mixers are faster.

The capacity of the mixer to be furnished these gangs should depend largely on the magnitude of the majority of the concrete jobs required. A ½-bag mixer is large enough to take care of ordinary repair jobs, and should be large enough for the use of building gangs. Bridge gangs, which are often called upon to pour concrete in larger quantities, may require a

mixer with a capacity of one to three bags. This applies particularly to regional or system bridge gangs which may be required to pour abutments or piers in making renewals or other major repairs to the foundations of large bridges.

The type of mounting to be decided upon will depend upon the size of the mixer. A one-half or a one-bag mixer may be mounted on two wheels, preferably with pneumatic tires. This type of mounting will permit the mixer to be towed by an automobile or truck, or carried on a trailer car. Larger mixers should have four wheels, and can also be towed by a truck, but do not lend themselves to push-car handling.

The smaller mixers can easily be supplied with water by buckets. It is advisable, however, to provide water connections for the larger mixers because the amount of water required make manual handling uneconomical and too slow.

The only alternatives to the use of concrete mixers is to mix the concrete by hand and be satisfied with an inferior product, or obtain ready-mixed concrete. Unfortunately, plants supplying this material are confined to fairly large communities, while most of the concrete work on railroads is at outlying points where the expense of transporting ready-mixed concrete would be prohibitive even if it were practicable.

Where To Use Spring Frogs

What, if any, limitations should be put on the use of spring frogs on curves? On tangents? Does the degree of the curve, the weight of rail, the amount or direction of traffic make any difference? Why?

Never Use On Low Rail

By L. J. Drumeller
Engineer of Track, Chesapeake & Ohio, Richmond, Va.

The use of spring frogs at any location should be limited to turnouts which are used infrequently, such as hot-box spurs, remote set-off tracks, etc. It is my opinion, however, that rigid frogs should always be used in turnouts at the ends of double tracks, passing sidings, etc., because of their more frequent use.

In addition to the foregoing, I doubt the advisability of using spring frogs on the low side of curves under any circumstances, and especially when super-elevation is required for high-speed passenger service and the track is also used by low-speed heavy freight trains. Under such conditions, I have known spring frogs to last only from 8 to 24 months, in contrast to a normal service life of about 3 years for rigid manganese insert frogs.

While it is agreed that spring frogs will give better riding comfort than solid frogs, the nature of their design is such that careful consideration should be given to all of the local conditions before deciding which type of frog to use.

Uses Should Be Limited

By General Roadmaster

Spring frogs should be used only where they can be maintained almost as cheaply as a manganese insert frog, and where their length of life will be nearly as long. Both the cost of their maintenance and their length of service are almost in direct proportion to the number of times the spring rails open and close. That means, in effect, that they are only economical where the traffic through the turnout side is light.

The extent of their use has been varied. Many old, cautious foremen, having lived with rigid frogs since the day they started to work, had grown to expect nothing better than the battering and pounding the treads of wheels gave them, and took it for granted that they had to surface them time after time because of that pounding. They were reluctant to accept their first spring frog, anticipating a hazard because of the freely moving spring rail. They would admit the possibility of saving in surface maintenance but feared the uncertainty of anything loose on their railroad. Experience proved to them that such a device gave them time to work somewhere else once in a while, and they began to clamor for spring frogs at every main-track turnout. Officers of the railroad, appreciative, not only of the lesser damage to surface and line, but also of the better riding qualities produced by the lack of pounding, fostered the extended use of such frogs.

Their use spread from little-used turnouts on branch lines to similar locations on main lines, etc., until they were used almost everywhere except at interlockings. Many unwise uses, aggravated by inherent disadvantages in the frogs themselves, increased weights of motive power, and higher train speeds, soon caused them to be "shaken" into disrepute. Today opinion as to when and where to use them is varied according to each individual's personal experiences with their advantages and disadvantages.

The heavy traffic of the war years crystalized my own opinion until I would now restrict their use to much narrower limits than previously. I do not believe they should be used on the low sides of curves, especially where freight trains are operated at speeds lower than that for which the individual curve is elevated. In such cases the spring rail, being only open-hearth steel, flattens rapidly until either it or the whole frog must be renewed. In such cases manganese insert frogs will last longer.

I would not use spring frogs in facing-point turnouts where the speed is scheduled over 50 m.p.h. In such cases the hazard resulting from the broken end of a spring rail permitting the rail to be driven completely out of the frog is too great to permit their use. Of course, the danger in such instances would not be in the wheels "picking" the frog point, because the guard rail would still be a protection, but rather from wheels being damaged by pounding in the throat and on the point of the frog.

On tracks where the speed is scheduled above 70 m.p.h., I question the economy of using spring frogs in trailing turnouts. In these situations the shock of the wheels passing the rigid point and striking the spring rail causes varying movements inducing the spring rail to creep open under the train. While this is not dangerous it does cause excessive wear and flattening of the spring rail. If the movement does induce the spring rail to creep open, leaving a gap, the effect is that of a bolted, but not rigid, frog, which is prohibited on some railroads, for main track use, especially where speeds are high.

By these criticisms I would not infer that spring frogs are not without merit, but rather that their usefulness and value lies, not in their indiscriminate replacement of rigid frogs, but in very careful selection of their points of use so as to obtain the lasting good-riding qualities for which they were designed.

Diesels' Water Requirements

In what ways and to what extent does Dieselization of high-speed trains affect the quantity and quality of water supplies? The type of pumping and station equipment?

Smaller Amount Required

By R. E. Coughlan
Chief Metallurgist & Engineer of Tests, Chicago & North Western, Chicago

Dieselization of high-speed trains has resulted in smaller amounts of water being used at the individual water stations than were used when the same trains formerly operated with steam locomotives.

Water which contains a minimum of dissolved solids is required for Diesel locomotives, especially for the operation of the flash boiler used in heating the train. This water must be equivalent to distilled water if expensive maintenance and cleaning is to be eliminated. The water used in the radiators and cooling facilities of the engine must be of very low hardness, and should be treated with inhibitors to prevent corrosion. The most suitable type of pumping equipment is the high-speed electric pump which will deliver the required amount of water in the shortest space of time.

Highest Quality Needed

By B. W. De Geer
Engineer Water Service, Great Northern, St. Paul, Minn.

The quantity of water required to operate high-speed Dieselized passenger trains, exclusive of water supplied to the cars themselves, probably averages only 5 or 10 per cent of the amount needed to operate similar steam trains. In freight service the only water required is for cooling purposes, and amounts to a tiny fraction of that required for steam operation.

However, water used for cooling purposes in Diesel-engine radiators should be as close to distilled water as possible; and corrosion inhibiting chemicals, consisting of chromates for the most part, should be maintained at a concentration of about 125 grains per gallon at all times. This requires the checking of radiator water at each terminal, and the addition of the amount of chemical indicated by the tests. Where distilled water, or its equivalent, has not been available, fair results have been obtained by using water containing up to 10 g.p.g. of hardness, with total dissolved solids up to 35 g.p.g., and properly conditioning it with the chemicals available for the purpose.

There is some difference of opinion as to the type of water that is suitable for use in the steam generators which heat Dieselized passenger trains. Experience has shown, however, that almost all water that gives good results in steam locomotives can be used successfully in these generators if a small amount of phosphate and organic matter is added. This additional treatment is usually carried in a small tank on the locomotive, and applied with a diaphram or plunger pump. It is axiomatic that the best water available should be used in such steam generators, preferably conditioned distilled water, or lime soda-treated water that is free from suspended matter and contains a minimum of dissolved minerals. When such water has not been available, however, fairly hard wayside-treated water has been used successfully, except for the small amount of difficulty occasioned by the necessity of cleaning the screens frequently, and following a very carefully regulated schedule of firing and blowing down the generators.

Because of the limited time allowed for station stops, special equipment is usually required to supply water to Diesel locomotives. The water outlets are usually arranged so that all Diesel units, and the storage tank in the baggage car, if used, can be filled simultaneously. As the available gravity pressure is ordinarily insufficient to supply water in sufficient quantity in the time allotted, booster pumps capable of giving the desired results are often used.

Where suitable water for Diesel locomotives is not available at the location desired, underground tanks, equipped with pumps, etc., are sometimes installed. These can be filled with usable water either by pipe line or tank car.

Adding More Ties per Rail

When the number of ties per rail length is to be increased, either because of a change in standards, or by reason of a change in the classification of the track, what is the most satisfactory method of effecting the change?

Why Add More Ties?

By W. H. Sparks
General Track Inspector, Chesapeake & Ohio, Russell, Ky.

Why should there be more ties to each rail? Where we have regular size ties—8½ in. by 8½ in. or even 9 in. wide, spaced 20 and 21 in. between centers, there should be no need of more ties. This size of tie and the present weight of rail are adequate for heavy traffic in any sort of ballast.

When ties are put under the rails closer together, there is more damage done to the bottom corners of the ties in tamping with either picks or machinery. The present spacing is about as close as you can get ties together to keep them from being damaged in this manner. When ties are far enough apart, they can be tamped more solidly than when they are too close together. If ties are not spaced evenly or far enough apart, or the track is not raised high enough to give the tamping tools room to place the ballast under the ties easily, then both ties and ballast are damaged. Therefore, I see no reason to add more ties to each rail length if all the other present standards are observed.

Furthermore, more and more of our railroads are using or planning to use ballast-cribbing machines. With such methods of cleaning ballast, we must have room enough between the ties to work such tools easily. If these machines are built for present spacing, the only way to use them when more ties are added per rail would be to install smaller ties. We have increased the size of our ties to give us better track under less traffic than we have now, so why use smaller ties for heavier traffic?

Add When Skeletonizing

By J. C. Rouse
Extra Gang Foreman, Southern Pacific, Suisun, Cal.

The most economical method of effecting a tie respacing program is to do the work in conjunction with skeletonizing the track for a reballasting job. By giving the track a small raise at this time—just sufficient to free the ties from their beds—additional ties may be added, old ties renewed, and the remainder spaced as desired. Doing the work in this way will require less labor.

Another method of spacing ties

when increasing the number per panel is to do it when the track is being given an out-of-face raise of 1½ in. to 3 in. This will permit the ties to be moved to their new location with a relatively small amount of labor. On such a job, the ties are generally spaced and tamped before a train passes over the track, thus allowing them to settle uniformly on a new, live bed throughout the entire length of rail. This method is usually used following a rail job and serves the double purpose of creating a better bearing for the new rail and the ties, and makes a new live bed under every tie, which helps to maintain better riding track.

Digging out cribs to space ties, without giving the track a raise, leaves a series of weak spots under each rail. When a new tie is installed or an old one moved, it is never as solid as one on an undisturbed bed. Furthermore, the labor required to space ties in this manner is prohibitive.

Repairing Bridges by Welding

To what extent can welding be used in the repair and strengthening of existing bridges? What are its advantages? What are its limitations?

Should Be Engineered

By J. S. Hancock

Bridge Engineer, Detroit, Toledo & Ironton, Dearborn, Mich.

Welding can be used to great advantage in the repair and strengthening of existing bridges. It is particularly advantageous for making emergency repairs. Stringers, floor beams, truss members and connections which show signs of failure, because of overloading or faulty details, can be quickly and economically repaired and strengthened in place by welding. Any other method of repair might easily require new replacement parts obtainable only after considerable delay, and would require the use of falsework to carry the traffic until after they have been installed.

Railroads now have adequate welding equipment and experienced personnel in their locomotive and car repair shops, and many of them have experienced crews equipped for the field welding of trackwork and roadway structures. If these forces are not readily available for emergency field welding, experienced contract welders with mobile equipment can be obtained quickly. It should be kept in mind, however, that field welding has to be done under much less favorable conditions than shop welding, and that a man, thoroughly experienced in shop welding, might not have sufficient experience in field work to do satisfactory bridge welding.

The use of welding for major repair work, such as the general strengthening of a structure or the complete building up of large or heavy units, should be engineered, supervised and performed only by men thoroughly experienced in the latest approved technique. For emergency work this is desirable, but not necessary. As welding requires the heating of the contact surfaces to a high temperature, the resultant cooling can cause warping and locked-up stresses in the welded members, thus impairing the safety of the structure. Recent tests also disclose the fact that some types of welds tend to lower the fatigue strength of the original member. By controlling the speed of welding, and by using the method of step-back or skip welding; and by clamping, peening, preheating and post heating, as required, locked-up stresses and warping can be reduced to a minimum.

Reports have been published that illustrate the fact that welding of important structures should be engineered and performed only by those who are qualified in this field of work. In one case, where additional steel had been welded to viaduct columns to strengthen them, the compression in them had been increased considerably in excess of the amount they carried originally. In another case, the welding of a steel floor in place on a highway bridge caused the bridge to contract sufficiently to buckle the lower chord members. In a third case, a large welded water tank developed a small leak in one of its welded seams when it was first filled; and while two workmen were attempting to stop the leak by peening the weld, the tank exploded and collapsed.

It might be said that weld failures and the progress of welding have gone hand in hand over the past few years, and that much knowledge has been gained thereby. Today, I believe welding technique has progressed to the point where its use in repairing and strengthening bridge structures is both economical and entirely practical, and is limited in extent only by the qualifications and experience of those who engineer, supervise and perform the work.

Welding Maintains Traffic

By Assistant Engineer of Bridges

Welding can be employed advantageously to restore deteriorated metal or to strengthen the top and bottom cover plates of deck plate girders of short span lengths. It can also be used to repair stringers and floor beams of through spans of open-deck structures. In these cases, the length of span is a governing factor because it is usually necessary to re-dap the existing ties in the deck while the span is in service in order not to change the surface of the track.

New side plates can be added to the compression chords of through truss spans by placing them against the webs of the members and welding them to the toes of the vertical legs of the main angles. Girder spans, whose webs are not spliced for moment, may be strengthened somewhat by welding additional top and bottom horizontal splice plates to the existing shear splice plates and adjacent to the flange angles. These splice plates may in turn be either riveted or welded to the web plates. This method of strengthening a web splice eliminates the necessity of removing the stiffener angles on the shear splice and also the possibility of losing the camber in the span.

In certain of the older girder spans, the flange rivets are not spaced so as to develop the end shear in the member. In this event, the flange angles may be welded to the girder web in increments sufficient to develop the necessary shearing stress. Welding can also be used in the replacement of such detail pieces as bridge shoes. These can be made by welding thick, carbon-steel plates together to resemble cast-iron shoes. The resultant shoe should be annealed in the shop to relieve locked-up stresses.

It is our general practice not to employ welding in main tension members of through truss spans, because of the possibility of overheating and causing "stress raisers" which may cause the parent metal in the member to fail. Furthermore, welding should never be applied across the direction of stress. Care must also be exercised in proportioning the strengthening metal so that it will not end abruptly at one point and result in a "stress raiser". In general, reinforcement for top horizontal cover plates should be made narrower and thicker than the existing plates, while such reinforcement for bottom cover plates should be wider and thinner than the existing plates, to result in "down" welding in the field.

The greatest advantage of welding is that it makes it unnecessary to remove the member to be strengthened

from the structure, and results in less disturbance to the track. Considerable field drilling in relatively thick metal is also eliminated, and shop fabrication is simplified.

Supervision Required

By Bridge Engineer

Expert study is necessary before welding is used in the repair and strengthening of weakened bridges. If such study indicates that welding will be economical, well-prepared plans and specifications should be made; and, when the work is being performed, expert supervision must be provided.

It is found, in many cases, that the top flanges of deck girders, truss members, floor beams and cover plates can be welded without further weakening of the member and also without the use of false work.

If welding is decided upon, it is well known that "down-hand" work is the easiest, fastest, and safest to perform. For these reasons the members, such as floor beams, stringers, brackets, etc., should, wherever practicable, be assembled completely outside the structure and welded in place.

Some of the older bridges may be of wrought iron, or so lightly constructed that they cannot be readily repaired or strengthened by using rivets. Such structures can be strengthened by simply welding new material to the weakened members. Brine drippings, locomotive exhaust fumes, salty air and other corrosive agents often cause damage to rivet heads. In locations where rivets cannot be redriven, new heads can be welded on them. These new heads will be less subject to corrosion and more lasting than those of the original rivets.

In spite of these advantages, welding will not replace all riveting as each method has its economical and structural place in the repair and strengthening of bridges.

Storing Portable Snow Fences

How should portable snow fences be stored when not in use? Can they be left in place? What are the relative advantages? The disadvantages?

Permanent Fences Better

By W. O. Cudworth
Engineer Maintenance of Way, Canadian Pacific, Toronto, Ont.

An effective snow fence must be so located that it will prevent snow drifts from forming on the track. If the right of way is wide enough, it is, of course, possible to build a permanent fence along the property line. For this purpose, open boarded fence is provided similar to the A.R.E.A. design, having a height sufficient to protect the track adequately at the location involved.

Where the right of way is narrow, or where drifting is heavy, a temporary fence is usually erected on private property adjacent to the right of way. The Canadian Railway Act permits a railroad after November 1, to enter on any land lying along the right of way for the purpose of erecting and maintaining snow fences, subject to payment of any actual damages suffered, and provided such fences are removed before the first day of the following April.

Our temporary or portable snow fences are generally of two types. One of these is the open boarded, collapsible "A-frame" design, made up in panels 14 to 16 ft. long, with 1-in. by 6-in. rails of undressed lumber placed horizontally, 2 to 4 in. apart on 2-in. by 6-in. by 9-ft. sills. These sills are intersected by the inclined back posts at a point 7 ft. above the ground, which have two rails nailed to them at the top, to form a hood over the panel. The other design used is the open slat-on-wire type so commonly used by highway departments. Such fencing is ordinarily 4 ft. high and is furnished in 100-ft. rolls. It is usually erected on metal "T" posts, second-hand boiler tubing or, in some instances, on wooden posts to which it is fastened by wire clips.

As both of these types are generally placed on private property, they must be removed each spring. Our practice has been to store the board-type fence in a convenient spot on the right of way near where it is required, being careful to pile the panels clear of the ground in such a way that air can circulate freely through them, and so that grass fires will be unable to reach them.

The slat-type fence is rolled up after the posts have been pulled and is stored in piles on the right of way convenient to the site where used. These storage piles are laid on supports of old ties, which are placed in an area where the sod has been removed. This method provides for the circulation of air and minimizes the possibility of damage by fire and decay.

The main advantage which may be claimed for these procedures is that they reduce to a minimum the handling of such fencing where it is impossible to leave it in place or where it is impractical to acquire additional land so that permanent fences can be erected. Where any type of fencing is necessarily used that requires rehandling its maintenance is high, and for this reason careful consideration should always be given to the possibility of replacing it with permanent fencing wherever this practice is found to be feasible or economically warranted.

Never Leave It Standing

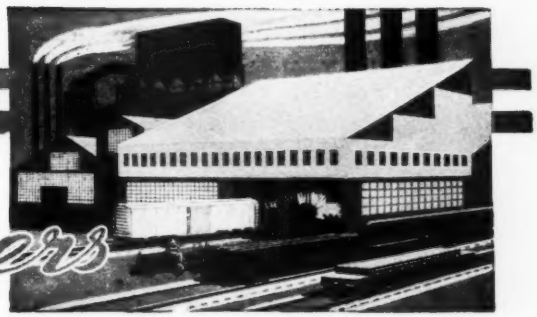
By C. Halverson
Division Roadmaster, Great Northern, Willmar, Minn.

Portable snow fence panels, when not in use, should be taken down and piled in such a manner that they will not be damaged by the wind. At times portable snow fences are placed on private property at points where there is insufficient right of way. Generally, where this practice is followed, the owners of the property request that the panels be removed early in the spring so they will not interfere with seeding.

Such portable fence panels should not be left in place between snow seasons because of the possible damage which might result from exposure to the weather. Furthermore, if they are left standing they are frequently blown down by the wind and damaged. This damage usually exceeds the saving in labor that is effected by leaving them in place. Wherever the right of way is sufficient the more sturdy permanent type of snow fence should be erected instead of portable panels.

Good results have been obtained by the use of the lath-type fence, commonly used by highway departments. By using 9-ft. steel posts, this fence can be placed to clear the ground by 12 in. to 18 in. to allow the drifts to form in front of it, and prevent it from being covered. It can be raised to the desired height by moving it up on the posts. The work of setting up the fence and raising it can be done with a small section force of three or four men and in the spring it can be rolled up in 100-ft. lengths and piled. This type of snow fence can be maintained at considerably less expense than the panels made from one-inch boards and 2-in. by 4-in. posts.

PRODUCTS of Manufacturers



(For additional information on any of the products described in these columns, use postcards, page 465)

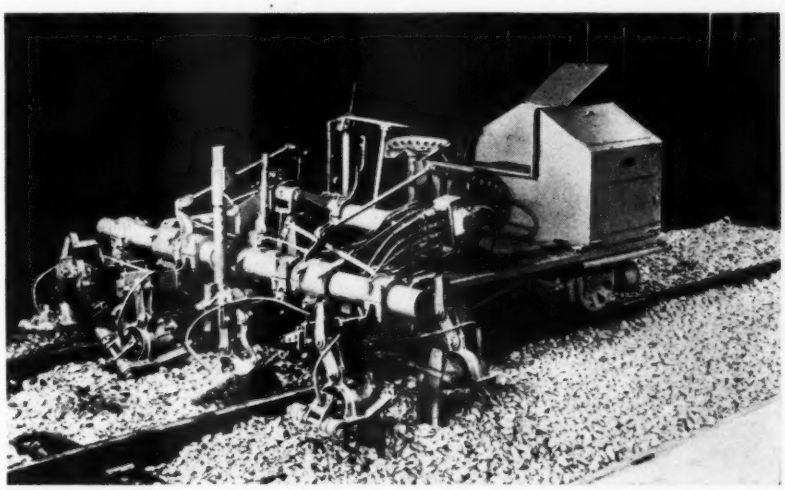
Jackson Multiple Tie-Tamping Unit

A TRACK-MOUNTED, self-propelled multiple tamping machine has been announced by the Electric Tamper & Equipment Co., Ludington, Mich. Known as the Jackson Multiple Tamper, this machine is operated by one man and is equipped with eight individual, electric vibratory tampers, so arranged as to perform eight-point tamping on each individual tie. The machine is reported to be capable of finish-tamping three to five ties per minute, depending on the amount of the raise.

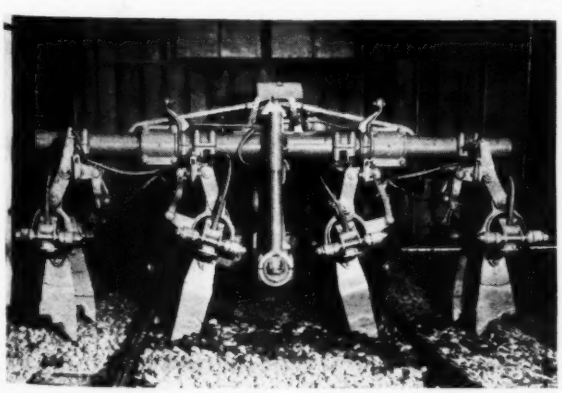
The tamping units are attached to a heavy transverse crosshead by means of cradle mountings. The crosshead is mounted on the front end of a four-wheel carriage by means of a cantilever arm arranged to move in a vertical plane. In operation, the crosshead and attached tampers are raised and lowered hydraulically, controlled by a single valve, while the machine is moved from tie to tie by the operator with the aid of a hand-wheel drive.

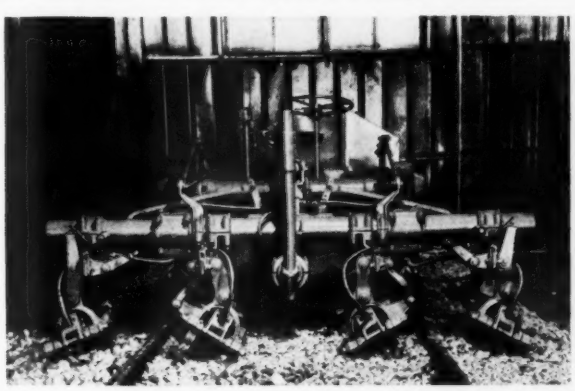
The electric tampers are mounted so that the blades of each pair of opposed tampers incline toward one another under the tie, and the mounting is also such as to permit them to be cocked under the rail as the tampers penetrate into the ballast crib.

Where the track raise does not exceed three inches, two insertions of the tampers into the ballast are said to be desirable. On the first of these insertions, the tampers inside the rails are cocked to tamp under the rails while the outer units tamp the ties outside the rails. The entire tamping unit is then raised and the second insertion is made, during which all tampers are cocked to tamp under the rails. It is said that the vibratory action of the electric tampers causes each tie to be tamped to a full bearing against the rail base, squaring any slewed ties, and providing uniform compaction of the ballast material regardless of its type, without damage to the ties or ballast. Should the raise exceed three inches, a repetition of this tamping cycle is recommended. As the tamp-



General View of the Multiple Tamper As It Would Appear at the End of the First Insertion. Note That the Weight of the Unit Is Supported on Tamped Track





Above Left—The Jackson Multiple Tamper With the Tamping Unit Raised For the First Insertion. Note That the Four Outside Tampers Will Tamp the Ends of the Ties While the Inside Tampers Are Canted to Tamp the Ballast Under the Rail. Above Right—The Tamping Unit in the Lower Position at the End of the Second Insertion. All of the Tampers Are Canted to Tamp Under the Rail

ing unit is located in advance of the carriage, the weight of the machine is always supported on tamped track.

The Multiple Tamper is powered by a 20-hp. Wisconsin gasoline engine which not only drives the generator for the electric tampers, but which also operates hydraulic pumps for raising and lowering the tamping unit and propels the unit along the track when running to and from the point of work. The tampers are operated with three-phase, 110-volt, 60-cycle current, but a single-phase outlet is available for lights and electric tools. It is said that the unit, which weighs approximately 4,000 lb., may be removed from the track to a prepared set-off by three men in approximately three minutes.

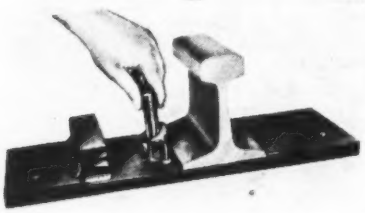
A four-wheel closed-body trailer is furnished as standard equipment with the Multiple Tamper. This trailer is supplied with an assortment of spare parts and tools, including two complete Jackson tampers and two spare tamper motors. Where necessary, two or four Jackson tampers may be plugged into the generator outlet to be used at switches, at special trackwork, and at other locations where use of the multiple tamper would be restricted.

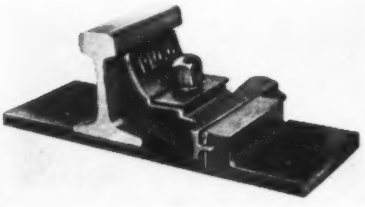
Adjustable Rail Brace

A NEW adjustable rail brace, known as the Topnotcher, which affords a means of fastening the brace-holding bolt to the top of the brace plate rather than extending it through to the underside, is now being manufactured by the Pettibone Mulliken Corporation, Chicago.

The principal feature of the new brace is the Topnotcher, a specially-designed lug which is welded to the plate, to provide a means of holding in place a machine-head bolt, which, when assembling the brace, is inserted into a recess in the Topnotcher with the threaded end up. When the brace is properly fitted against the rail, the end of the bolt projects above it and a square-head acorn nut is then applied to the bolt to hold the brace in position. A tightening wedge is then driven between the brace and a wedging cleat, welded to the brace plate.

Advantages claimed for the new rail brace include quick and easy assembly, simplified bolt replacement, less frequent adjustment occasioned by the use of heavier material, and uniform fit because of the forged assembly. The squarehead acorn nut is said to permit a turn of 180 deg. with a standard track wrench.



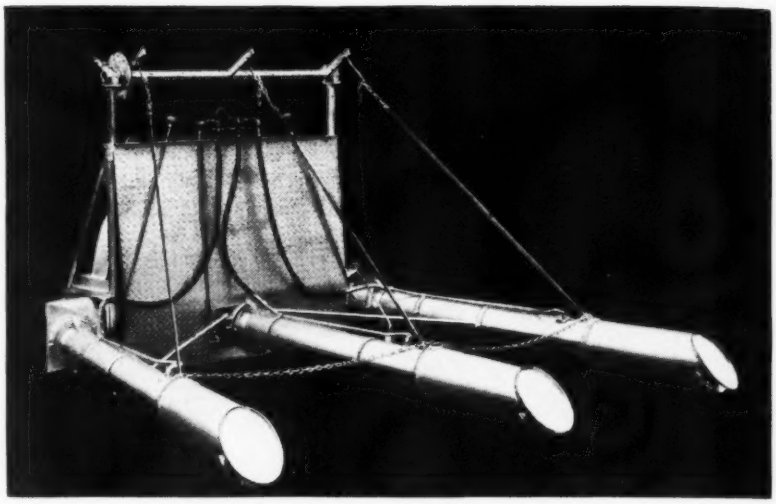


Above—Inserting a Bolt Into the Topnotcher Which Is Welded To the Brace Plate Below—The Topnotcher Adjustable Brace Completely Assembled

Thornley Cribber

IN the article on page 404 of the April issue describing the Model D Thornley Cribbing Machine, developed by the Thornley Railway Equipment Company, Joliet, Ill., it was stated that the steel counterweight box on the machine is welded to telescoping pipe extensions "so that the box can be quickly shifted as necessary to clear for trains passing on an adjacent track."

This statement was in error in that the counterweight box does not foul the adjacent track. The telescoping feature is provided to facilitate clearing any obstructions, such as cattle guards, switch stands, etc., or to permit the box to be removed entirely if desired.



The Woolery Model PB Weed Burner

Woolery Weed Burner

A NEW model, known as Model PB, has been added to the line of weed-burning equipment manufactured by the Woolery Machine Company, Minneapolis, Minn. Suitable for on or off-track operation, this unit, which weighs 820 lb., may be mounted on a push truck to be hauled by a track motor car when operated on the track, or, for off-track use, it may be mounted on a 1½-ton truck or trailer. When not in use it may be removed and put into storage, thereby releasing the truck or push car for other work.

The unit consists of a supporting frame on which are mounted a fuel tank, a 10-hp. air-cooled gasoline engine, a fuel pump and an 8-in. steel, pressure-type blower. Three burner tubes, 4 ft. to 8 ft. long as desired, extend in front of the supporting frame, positioned to burn a 15-ft. swath. By making a second trip with the outside arms spread to a wider angle the width of the swatch may be increased to 25 ft.

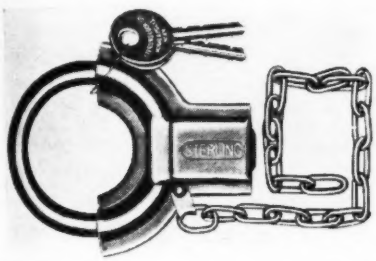
When the unit is moved at a speed of 6 m.p.h., the fuel-oil consumption is said to amount to 30 gal. per mile. The burners may be raised or lowered as necessary and individual flame controls are provided for each burner arm. This new burner may be operated by two men.

Rotary-Type Lock

THE Sterling Lock Company, Minneapolis, Minn., is offering a rotary type lock that is said to be suitable for many applications in the railroad field where a strong weather-resistant lock is required. The lock is con-

(For additional information on any of the product s described on this page, use postcards, page 465)

structed with only four principal parts—a rotary shackle ring, a front plate, a back plate and a locking assembly. The shackle ring is made of cold-rolled, case-hardened steel, said to be capable of withstanding files, chisels or hack saws, and is formed in the shape of a ring with an opening to permit it to be passed through a hasp or other fastening. The front and back plates are forced together in the manufacture of the lock and are fastened permamanently by overlapping. The



One of the Sterling Rotary-Shackle Locks

shackle ring and the plates are cadmium plated, while the locking assembly is of brass.

It is said that the construction of the lock, without springs or rivets, prevents it from jamming and that, because of the rotating feature of the shackle, any strain is transmitted to the body of the lock rather than to the locking piece. The lock is available with a shackle ring 1¾ in. or 2¼ in. in diameter as desired. A variety of key combinations are available or, if desired, any quantity of locks may be keyed alike. The locks may also be obtained with a 9-in. fastening chain.

Tracto-Shovel

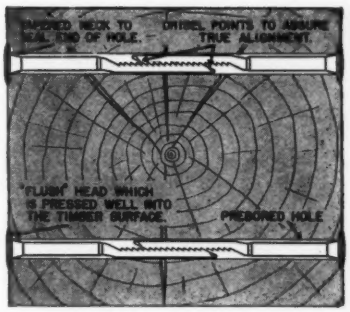
A NEW type tractor-shovel, the Tracto-Shovel, and the first of a line of tractor equipment to be built by the newly-organized Tractomotive Corporation, Findlay, Ohio, has recently been announced. Designed specifically for mounting on the new Allis-Chalmers HD-5 tractor, the Tracto-Shovel is said to be unusually versatile for construction work where shoveling and loading operations are required.

The shovel bucket is mounted at the forward end of a pair of pivoted push arms which are raised and lowered by hydraulic means. A crank, also hydraulically controlled, governs the tilt of the bucket and, when the bucket is full, it is said to be automatically tilted back into the carrying position. Another advantage claimed for the unit is that clear vision is provided for the operator with the bucket in any position.

The HD-5 tractor is a new addition to the line of crawler tractors manufactured by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Rated at 37 hp. and weighing approximately 11,000 lb., the new unit has five forward speeds up to nearly 6 m. p. h. It embodies such features as two-cycle Diesel power, 1,000-hr. track lubrication, and 10,000-lb. draw-bar pull.

It is said that the tractor has superior balance and that this factor, coupled with its tractive power and speed, makes it suitable for many uses in heavy construction work. The major assemblies of the tractor are said to be removable for quick repair or replacement.

The Tracto-Shovel Mounted on an Allis-Chalmers HD-5 Tractor



The Oliver Timber Grip Applied to a Crosstie

Timber Grip

THE Oliver Iron & Steel Corp., Pittsburgh, Pa., has developed the Oliver Timber Grip, a device for preventing ties from splitting, for holding closed any timber already split and for use in laminated timber construction.

The grip consists of two interlocking steel members which are introduced from opposite sides of the timber into a pre-bored hole. The members are each serrated or toothed at one end. When the toothed ends meet at the center of the timber, the application of hammer blows or a squeezing action will cause the ends to by-pass one another and the teeth to become engaged. The resulting grip is said to be capable of withstanding a pull of 5,000 lb. It is said that, since engagement of all of the teeth is not necessary, the grips may be used with timbers of various thicknesses.

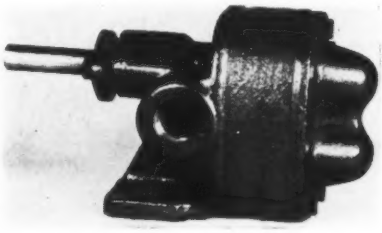
The grips are fashioned with a swelled shank to provide an effective seal against entrance of moisture into the hole in the timber. Forcing the heads of the grips into the surface of the timber is said to prevent any lessening of the tension between the two members, even if shrinkage should occur after the assembly is completed. For laminated construction, the grips can be used as stitch bolts to hold separate timbers together. At present the Oliver Timber Grips are made to fit timbers up to 12 in. in thickness. Larger grips are to be developed in the future.

Rotary Pumps

A NEW line of general-service rotary pumps, known as GA rotary pumps, has been introduced by the Worthington Pump & Machinery Corp., Harrison, N.J. Available in six sizes, with capacities up to 51 gal. per min., and in various mountings, these pumps are said to be well

(For additional information on any of the products described on this page, use postcards, page 465)

suited for handling fuel oil, Diesel oil, and lubricating oil, and for use at lubricating-oil reclaiming plants and locomotive grease sheds. The pumps are said to be designed for durability under severe service.



A Worthington GA Rotary Pump

Design features of the new pumps include four-bearing construction and special herringbone rotors. A built-in pressure-lubrication system is said to eliminate the need for external lubrication and the possibility of contaminating the liquid. Another feature claimed for the new pumps is easy maintenance resulting from a simple design. Said to be suitable for direct connection to electric motors of any make, the GA rotarys may be obtained either foot-mounted or flange-mounted, with adjustable stuffing box and mechanical seals.

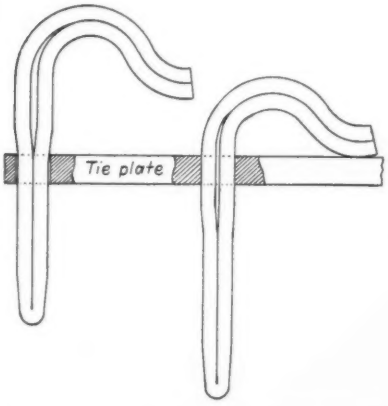
Tie-Plate Anchor Spike

THE Bernuth, Lembcke Company, New York, has developed a new type of spike for anchoring tie plates firmly to the ties and thereby reducing the abrasion, which is also said to be highly effective in maintaining correct gage. This spike is essentially a two-leaved spring, made of high-carbon, heat-treated spring steel, shaped in the form of a hook or arc with a straight shank. Weighing approximately 1 lb., the spike is driven through the tie plate with the arc parallel with the rail. The intention is that the spikes will be driven into pre-bored holes in the ties.

Because of the distance of the shank from the toe of the spike, it said that any forces which might tend to raise the tie plate and thus loosen the spike in the wood will react laterally and not vertically on the shank. This fact, coupled with the holding power of the square shank in the pre-bored hole, is said to result in the firm anchorage of the shank in the tie.

Driving the spike ⅜ in. to ½ in. deeper after the toe has made contact with the surface of the tie plate, deflects the head of the spike and is said thereby to produce a static pressure of several hundred pounds on the surface of the tie plate.

An exceptional feature of the new spike is the "built-in" spread between the leaves of the shank, which is so located as to engage the walls of the tie plate lag hole when the spike is driven to final position. This spread is compressed approximately 1/16 in. by the walls of the hole, thereby taking up the play, or tolerance, between the shank and the tie plate.



Drawing of the Anchor Spike Manufactured by Bermuth, Lembke Company, Showing the Compression of the Spread Between the Leaves of the Shank, and the Manner in Which the Toe of the Hook Exerts Pressure on the Plate to Hold it Firmly to the Tie

Because of this feature it is said that the destructive horizontal movement of the tie plate which causes tie abrasion and plate penetration is greatly reduced.

Adjustable Saw Track

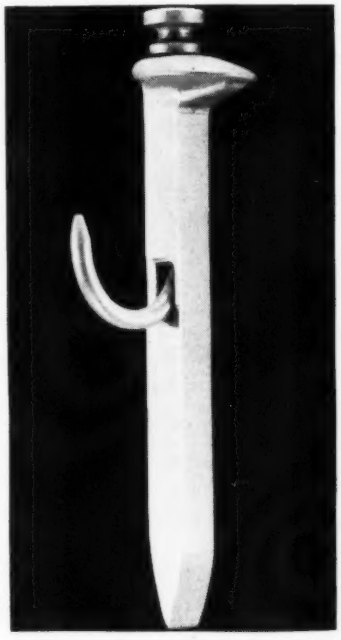
STANLEY Electric Tools, Division of The Stanley Works, New Britain, Conn., has announced the new Stanley saw track, No. 158, constructed of structural welded steel and designed for use with Stanley safety saws W7, W8, and W9 when making square, bevel, or bevel mitre cuts.

Showing How the Saw Track Is Used With Stanley Safety Saws

The new track is said to eliminate the laying out and working of each piece of lumber, and thereby to effect economies in cutting lumber to the exact size desired.

New Type Spike

AN ENTIRELY new type of railroad spike, which is said to provide unusual gripping power and resistance to loosening, has been recently announced by the Morgan Loxpike Company, Detroit, Mich. The spike consists of two parts, one of which is a spike similar in size and shape to the conventional cut spike. However, a countersunk hole extends from the top of the head halfway through the shank and is curved at its lower end to an opening in one side. A blunt-nosed 40-penny nail with a special head comprises the second part of the Loxpike.



The Loxpike As It Would Appear After Installation in the Tie

To apply this spike it is driven into the tie in the usual manner and the nail is then inserted through the hole in the main spike and driven home. The curve at the lower end of the hole causes the nail to bend progressively and form a hook which provides the added gripping power claimed for the spike. During a series of tests it was reported that when the Loxpike was withdrawn about ⅛ in. and the pulling force than released, the spike would spring back to practically its original position in the tie.

(For additional information on any of the product s described on this page, use postcards, page 465)

Changes in Railway Personnel

General

Julius W. Pfau, assistant to vice-president, improvements and developments, of the New York Central, at New York, and an engineer by training and experience, has retired after almost 46 years of service.

Robert E. Mattson, assistant general superintendent of transportation on the Northern Pacific, at St. Paul, Minn., and an engineer by training and experience, has been appointed general superintendent of transportation, with the same headquarters.

Robert J. Stone, superintendent of the Mobile division of the Southern, with headquarters at Selma, Ala., and an engineer by training and experience, has been appointed superintendent of the Northern division of the St. Louis-San Francisco, with headquarters at Fort Scott, Kan., succeeding **C. K. Sims,** deceased.

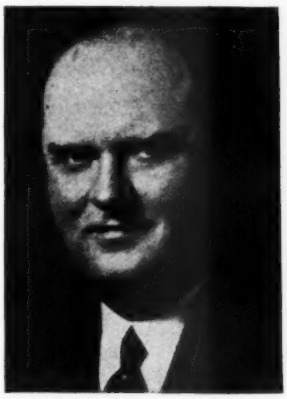
W. W. Judson, general manager, operating, of the Northern Pacific, at St. Paul, Minn., has been appointed vice-president

W. W. Judson

of maintenance and operation, with the same headquarters, succeeding **H. E. Stevens,** who retired on April 1.

Mr. Judson was born at Rochelle, Ill., on March 24, 1891, and received his higher education at Knox College and at Dartmouth College. He entered railroad service in 1912 in the engineering department of the Spokane, Portland & Seattle, at Portland, Ore. On October 11, 1914, he entered the service of the Northern Pacific as a rodman in the engineering department at Centralia, Wash. Released from the armed forces as a first lieutenant, he returned to the Northern Pacific in 1919 as an assistant engineer of maintenance and construction. In 1928 he entered the operating department as a special assistant to the vice-president, at St. Paul, and one year later he was appointed trainmaster at Pasco, Wash. From 1933 to 1936 he served as assistant to the general manager at Seattle, Wash. In 1936 Mr. Judson was appointed superintendent, and served successively on the Yellowstone and Rocky Mountain divisions. On February 1, 1940, he was advanced to general manager, with headquarters at St. Paul, the position he held at the time of his recent appointment.

Lawrence Sugg Jeffords, chief engineer of the Atlantic Coast Line, has been promoted to general manager, with headquarters as before at Wilmington, N. C. Mr. Jeffords was born at Florence, S. C., on July 2, 1892, and attended Clemson College in South Carolina. Entering railroad



Lawrence S. Jeffords

service on March 1, 1910, in the engineering department of the Atlantic Coast Line, Mr. Jeffords served successively until January, 1921, as rodman, concrete inspector, levelman, transitman, resident engineer, assistant division engineer, roadmaster, superintendent steam shovel, and assistant engineer maintenance of way. From January, 1921, to January, 1925, he was engineer maintenance of way of the Charleston & Western Carolina (controlled by the A.C.L., and on the latter date he was appointed superintendent of that road, becoming general superintendent in July, 1940. Mr. Jeffords was appointed chief of personnel of the Atlantic Coast Line in September, 1944, and on February 1, 1945, he became chief engineer, which position he was holding at the time of his recent appointment as general manager.

Engineering

C. E. Merriman, assistant engineer on the Atchison, Topeka & Santa Fe, has been appointed construction engineer, with headquarters at Topeka, Kan.

J. R. Cunningham, Jr., instrumentman on the Virginian, has been appointed assistant engineer, with headquarters at Roanoke, Va.

G. A. Kellow, special water inspector on the Chicago, Milwaukee, St. Paul & Pacific, has been appointed assistant engineer, with headquarters at Chicago.

Raymond Westcott, assistant division engineer on the Reading, at Wyomissing, Pa., has been appointed division engineer, with headquarters at Reading, Pa.

R. E. Caudle, principal assistant engineer on the Missouri Pacific, has been appointed assistant engineer structures, with headquarters at Houston, Tex.

E. Q. Johnson, supervisor bridges and buildings on the Ann Arbor, at Owosso, Mich., has been appointed assistant engineer on the Florida East Coast, with headquarters at St. Augustine, Fla.

H. W. Van Hovenberg, sanitary engineer on the St. Louis Southwestern, has been appointed engineer of tests and sanitation, with headquarters at Mt. Pleasant, Tex.

W. R. Bjorklund, division engineer on the Northern Pacific, at Glendive, Mont., has been appointed assistant district engineer, with headquarters at Billings, Mont.

W. O. Towson has been appointed principal assistant engineer on the Baltimore & Ohio, with headquarters at Baltimore, Md.

C. E. Gudgell has been appointed assistant engineer on the Missouri Pacific, with headquarters at Monroe, La., succeeding **E. Haner,** who has retired.

G. F. Metzdorf, assistant chief draftsman on the New York, Chicago & St. Louis, has been appointed assistant designing engineer, with headquarters at Cleveland, Ohio.

W. L. Fisher, fire prevention engineer on the New York Central, at Cincinnati, Ohio, has been appointed timber treatment engineer, with headquarters at Indianapolis, Ind.

A. J. Hegele, acting special engineer of the Wheeling & Lake Erie and the Lorain & West Virginia, has been appointed special engineer, with headquarters as before, at Cleveland, Ohio.

L. W. Koenig, supervisor of labor camps on the New York Central, has been appointed assistant engineer, with headquarters at Detroit, Mich. **E. A. McLeod,** designer, has been appointed assistant engineer, with headquarters at Chicago.

J. W. McReynolds, assistant division engineer on the Chicago, Milwaukee, St. Paul & Pacific, at La Crosse, Wis., has been appointed division engineer on the Kansas City division, with headquarters at Ottumwa, Iowa.

George G. Amory, assistant engineer on the Chicago & Western Indiana, at Chicago, has been appointed office engineer, with the same headquarters.

C. R. Gates, division engineer on the Southern, has been appointed assistant to the chief engineer maintenance of way and structures, with headquarters at Atlanta, Ga. **W. H. Hoar,** assistant engineer bridges, at Cincinnati, Ohio, has been appointed assistant division engineer, with headquarters at Birmingham, Ala.

M. L. Bardill, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Ottumwa, Iowa, has been appointed division engineer of the Terre Haute division, with headquarters at Terre Haute,

Ind., succeeding **C. L. Waterbury,** whose appointment as supervisor of fuel and water service, with headquarters at Chicago, is reported elsewhere in these columns. **F. F. Hornig,** assistant engineer, at Mason City, Iowa, has been appointed division engineer, with the same headquarters, succeeding **I. C. Brewer,** who has been transferred to the Milwaukee division, with headquarters at Milwaukee, Wis.

D. B. Packard, Jr., division engineer on the Atlantic Coast Line, at Rocky Mount, N. C., has been appointed special assistant engineer, with headquarters in Wilmington, N.C.

A. C. Hoyt, engineer of surveys on the Chicago Great Western, at Chicago, has been appointed engineer of bridges and buildings of the Elgin, Joliet & Eastern, with headquarters at Joliet, Ill.

E. M. Loebs has been appointed chief engineer of the Chicago & Illinois Midland, with headquarters at Springfield, Ill., to succeed **C. H. Paris,** who retired on April 20 after 21 years of service with this company. **N. E. Peterson** has been appointed engineer maintenance of way, also with headquarters at Springfield.

Robert L. Groover, assistant chief engineer of the Atlantic Coast Line, has been promoted to chief engineer, with headquarters as before at Wilmington, N. C., succeeding **Lawrence S. Jeffords,** whose promotion to general manager is noted elsewhere in these columns. **Charles Spurgeon Sanderson,** principal assistant engineer, has been appointed assistant chief engineer, with headquarters as before at Wilmington. **C. R. Lapeza,** acting division engineer at Savannah, Ga., has been appointed office engineer at Wilmington, succeeding **M. W. Clark,** who has been appointed principal assistant engineer, with the same headquarters, to replace Mr. Sanderson. **L. E. Bates,** roadmaster at Wilmington, has been appointed engineer maintenance of way of the Southern division, with headquarters at Jacksonville, Fla., succeeding **W. J. Turner,** who has been promoted to assistant chief engineer at Wilmington.

Robert L. Groover

Mr. Groover was born at Quitman, Ga., on November 7, 1891, and received his bachelor of science degree in civil engineering from Alabama Polytechnic Institute in 1914. He entered railroad service in September, 1914, with the Atlantic Coast Line as inspector, subsequently serving as rodman and draftsman, maintenance of way, until March 1, 1916, when he went with the Central of Georgia as draftsman. In November, 1916, Mr. Groover returned to the Atlantic Coast Line and served successively as draftsman, computer and pilot engineer in the valuation department. He was appointed assistant engineer maintenance of way in November, 1918, and in May, 1920, he became assistant engineer in the office of the chief engineer. From December, 1924, to 1929, Mr. Groover served as office engineer, becoming engineer of design in the latter year. He was appointed principal assistant engineer in December, 1941, being promoted to assistant chief engineer in November, 1944.

A. A. Visintainer, assistant engineer of structures of the Erie, at Cleveland, Ohio, has been appointed engineer of structures, with the same headquarters, succeeding **H. A. Dise,** who has retired after 29 years of service. **W. R. Marshall** has been appointed assistant engineer of structures, and **P. C. Chamberlain** has been appointed assistant engineer, department of structures, both with headquarters at Cleveland.

A. A. Visintainer

Mr. Visintainer was born at Mount Carmel, Pa., on October 11, 1903, and graduated in civil engineering from Lehigh university in 1926, immediately following which he entered railway service in the engineering department of the Erie on construction work at Youngstown, Ohio. On July 1, 1929, he was advanced to inspector and on January 1, 1939, he was promoted to construction inspector, advancing to assistant engineer in the department of structures on February 1, 1943. In December, 1944, he was promoted to assistant engineer of structures, at Cleveland, the position he held at the time of his recent appointment.

W. H. Rochester, acting chief engineer of the Gulf, Colorado & Santa Fe (part of the Atchison, Topeka & Santa Fe), has been appointed chief engineer, with headquarters as before at Galveston, Tex., succeeding **W. W. Wilson,** who has retired.

Mr. Rochester was born at Pendleton, S. C., on February 1, 1891, and received his higher education at Porter Military Academy, Charleston, S. C., and Clemson College, Calhoun, S. C. He entered railroad service in 1915 as a draftsman on the Nashville, Chattanooga & St. Louis, at Nashville, Tenn., and in October of the same year he became a chainman on the Atchison, Topeka & Santa Fe, at Arkansas City, Kan. He subsequently served as rodman, transitman, computer, and topographer on construction and location

W. H. Rochester

at various points on the Santa Fe until April, 1926, when he was promoted to assistant engineer in charge of construction, with headquarters at Chicago. In May, 1930, he was appointed construction engineer, and served in that capacity until August, 1937, when he was promoted to district engineer, with headquarters at Amarillo, Tex. In June, 1943, Mr. Rochester was appointed assistant chief engineer of the Coast Lines, with headquarters at Los Angeles, Cal., and in October, 1946, he was advanced to acting chief engineer of the road's Gulf Lines.

A. W. Duke, division engineer on the Ft. Wayne division of the Pennsylvania, at Ft. Wayne, Ind., has been appointed assistant to engineer maintenance of way on the Southwestern division, with headquarters at Indianapolis, Ind. **C. E. Gipe,** division engineer on the Renovo division, at Erie, Pa., succeeds Mr. Duke as division engineer at Ft. Wayne. **W. H. Kendall,** assistant division engineer on the Middle division, at Altoona, Pa., has been promoted to division engineer on the Renovo division, succeeding Mr. Gipe. **G. M. Smith,** supervisor of track on the Pittsburgh division, at Johnstown, Pa., has been promoted to assistant division engineer on the Middle division, with headquarters at Altoona, Pa., succeeding Mr. Kendall. **J. W. Buford,** supervisor of track on the Long Island, at Jamaica, N. Y., has been appointed assistant division engineer in the office of the chief engineer, with headquarters at Philadelphia, Pa.

A. R. Dewees, whose retirement as division engineer of the Detroit Terminal and Canadian divisions of the Pere Marquette, with headquarters at Detroit, Mich., was reported in the April issue, entered the service of the Pere Marquette in March, 1901, as a rodman at Greenville, Mich., on the construction of the Greenville-Stanton cut-off. From 1901 to

(*Continued on page* 508)

(*Continued from page* 506)

1913 he served in various capacities in the engineering department at Saginaw, and in the latter year he was appointed engineer of the Port Huron-Grand Rapids division. In 1922 Mr. Dewees was transferred to the Detroit Terminal and Canadian division, with headquarters at Detroit, the position he held at the time of his retirement.

Track

E. G. Law, roadmaster on the Northern Alberta at Edmonton, Alta., has retired.

C. R. Woodley has been appointed roadmaster on the Chicago & Illinois Midland, with headquarters at Springfield, Ill.

J. D. Styles has been appointed acting roadmaster on the Atlantic Coast Line, with headquarters at Petersburg, Va.

V. L. Leman has been appointed track supervisor on the Atchison, Topeka & Santa Fe at Las Vegas, N.M.

W. R. Worthington, track supervisor on the Wyoming division of the Erie, with headquarters at Dunmore, Pa., has retired.

J. A. Anderson, roadmaster on the Canadian Pacific, with headquarters at Souris, Man., has retired. **J. McManus,** roadmaster on the Laurentian division, with headquarters at Montreal, Que., has retired.

D. B. Smith, assistant roadmaster on the Louisiana division of the Missouri Pacific, at Ferriday, La., has been appointed roadmaster on the Memphis division, with headquarters at Wynne, Ark., succeeding **C. L. Isard,** who has retired.

J. S. Bradshaw, inspector, office of manager of roadway maintenance, Norfolk & Western, has been promoted to assistant roadmaster, at Norfolk Terminal, Va.

R. H. Fiagle has been appointed track supervisor on the Des Moines division of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, succeeding **Walter W. Linkey,** who has retired. **Charles M. Webb,** roadmaster on the Oklahoma division, at Enid, Okla., has retired.

J. E. Eisemann, recently released from the armed forces and formerly a transitman on the Atchison, Topeka & Santa Fe, at San Francisco, has been appointed roadmaster, with headquarters at Prescott, Ariz., where he succeeds **R. W. Johnson,** who has been transferred to Fullerton, Cal., to replace **Charles I. Jones,** whose death at Fullerton on February 12 is reported elsewhere in these columns.

R. B. Wallace, assistant supervisor of track on the Chesapeake & Ohio, at Ronceverte, W. Va., has been promoted to supervisor of track on the Alleghany and Hot Springs subdivisions, with headquarters at Clifton Forge, Va. **Basil Clark,** track foreman, has been appointed assistant supervisor of track on these subdivisions at Clifton Forge.

A. W. Hyland, assistant roadmaster on the Chicago & North Western, at Milwaukee, Wis., has been promoted to roadmaster, with headquarters at Harvard, Ill., succeeding **E. A. White,** who has been transferred to Sterling, Ill., where he replaces **R. E. Meyer,** who in turn has been transferred to Valentine, Neb., to replace **J. F. O'Rourke,** who has retired. **R. A. Lincoln,** section foreman on the Iowa division, has been promoted to assistant roadmaster, with headquarters at Milwaukee, succeeding Mr. Hyland.

J. A. Zullinger, supervisor of track on the Cleveland division of the Pennsylvania, at Akron, Ohio, has been transferred to the Pittsburgh division, with headquarters at Johnstown, Pa., where he replaces **G. M. Smith,** whose promotion to assistant division engineer on the Middle division, with headquarters at Altoona, Pa., is reported elsewhere in these columns. **H. M. Shoaf,** assistant supervisor of track on the Pittsburgh division, at Cresson, Pa., has been promoted to supervisor of track on the Cleveland division, with headquarters at Akron, succeeding Mr. Zullinger. **J. B. Smythe,** assistant supervisor of track on the Williamsport division, at Northumberland, Pa., replaces Mr. Shoaf on the Pittsburgh division, at Cresson. **J. M. Rankin,** assistant on the engineering corps, St. Louis division, has been promoted to assistant supervisor of track on the Williamsport division, succeeding Mr. Smythe. **G. A. Royce,** supervisor of track on the Ft. Wayne division, at Crestline, Ohio, has been transferred to the Long Island, with headquarters at Jamaica, N. Y., where he replaces **J. W. Buford,** whose appointment as assistant division engineer in the office of the chief engineer, with headquarters at Philadelphia, Pa., is reported elsewhere in these columns. **H. P. Morgan,** supervisor of track on the Monongahela division, at Shire Oaks, Pa., succeeds Mr. Royce at Crestline. **E. M. Hodges,** assistant supervisor of track on the Middle division, at Altoona, Pa., has been promoted to supervisor of track with headquarters at Shire Oaks, where he succeeds Mr. Morgan. **E. J. Maggi,** assistant supervisor of track on the Pittsburgh division, at Cresson, replaces Mr. Hodges on the Middle division. **E. J. Sierleja,** assistant on the engineering corps, Cincinnati division, has been promoted to assistant supervisor of track on the Pittsburgh division, succeeding Mr. Maggi. **H. A. Spruill,** supervisor of track on the Williamsport division, at Northumberland, Pa., has been transferred to the Ft. Wayne division, with headquarters at Warsaw, Ind., replacing **R. E. Miller,** who has been incapacitated for an indefinite period. **F. S. King,** assistant supervisor of track on the Eastern division, at Canton, Ohio, has been promoted to supervisor of track on the Williamsport division, with headquarters at Northumberland, succeeding Mr. Spruill. **R. D. Baldwin,** assistant supervisor of track on the Maryland division, at York, Pa., has been transferred to the Eastern division, to succeed Mr. King, at Canton. **P. A. Mainquist,** assistant on the engineering corps, Logansport division, has been promoted to assistant supervisor of track on the Maryland division, at York, succeeding Mr. Baldwin. **J. V. Adams,** assistant supervisor of track on the Philadelphia Terminal division, has been promoted to supervisor of track on the Logansport division, with headquarters at Logansport, Ind., to replace **J. E. Dixon,** who has been incapacitated for an indefinite period. **R. F. Hall, Jr.,** assistant supervisor of track on the Conemaugh division, at Aspinwall, Pa., has been transferred to the Philadelphia Terminal division, at West Philadelphia, Pa., succeeding Mr. Adams. **M. K. Clark,** assistant on the engineering corps, Chicago Terminal division, has been promoted to assistant supervisor of track on the Conemaugh division, with headquarters at Aspinwall, succeeding Mr. Hall.

Bridge and Building

B. L. Wright has been appointed assistant supervisor of metal structures on the Atlantic Coast Line, with headquarters at Florence, S. C.

A. C. Price has been appointed bridge and building master on the Bruce division of the Canadian National at Toronto, Ont.

C. A. Hughes has been appointed supervisor of bridges and buildings on the Elgin, Joliet & Eastern, with headquarters at East Joliet, Ill. **G. P. Lokotzke** has been appointed supervisor of bridges and buildings, with headquarters at Gary, Ind.

Water Service

L. Walters, supervisor of water service on the Grand Trunk Western, with headquarters at Detroit, Mich., has retired.

A. W. Johnson, assistant engineer on the Atchison, Topeka & Santa Fe, has been appointed engineer water service, with headquarters at Topeka, Kan.

C. L. Waterbury, division engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Terre Haute, Ind., has been appointed supervisor of fuel and water service, with headquarters at Chicago, succeeding **Kenneth Weir,** whose resignation to enter private employment was reported in the April issue.

Special

Thomas F. Conlon, system work equipment inspector of the Chicago & North Western, with headquarters at Fond du Lac, Wis., has retired.

Obituary

James G. Maynor, who retired in 1940 as roadmaster on the Missouri Pacific, with headquarters at Alexandria, La., died recently at St. Louis, Mo.

Charles I. Jones, roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Fullerton, Cal., died in that city on February 12.

Edwin W. Hammond, who retired as division engineer on the Buffalo-Rochester district of the Baltimore & Ohio, in November, 1943, died recently.

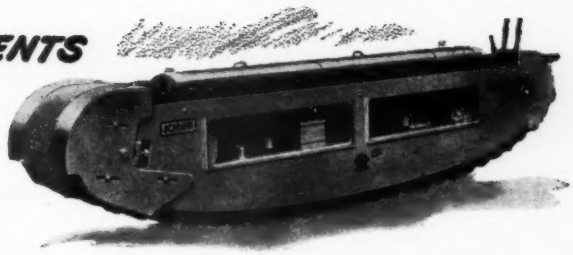
Noel W. Smith, who retired in December, 1939, as assistant chief engineer of the Pennsylvania System at Philadelphia, Pa., died on April 11.

(*Please turn to page* 510)

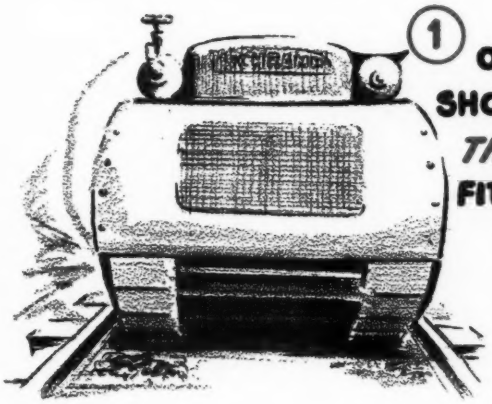
SCHRAMM INC. PRESENTS

The CRAWLER

FOR TAMPING MORE TIES PER DAY IN "HOT TERRITORY" DESPITE FREQUENT INTERRUPTIONS



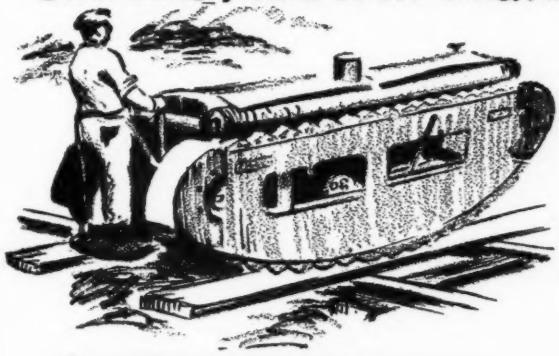
Built in capacities ranging from 105 to 315 cubic feet per minute actual air capacity and powering up to 24 tampers.



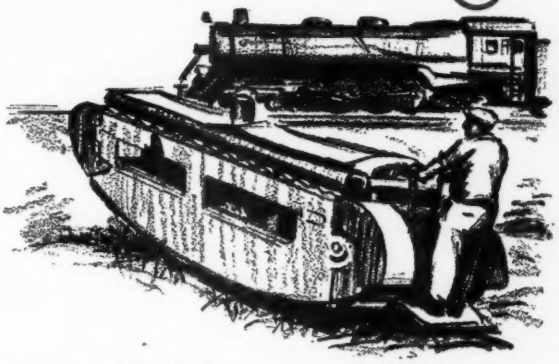
1 ON "NARROW SHOULDER" TRACK *THE CRAWLER* FITS BETWEEN THE RAILS

2 *TRAIN COMING!* SIGNALS THE LOOKOUT

3 CURVED TREAD SPINS CRAWLER *"ON A DIME"*, GETS IT OFF TRACK IN A JIFFY

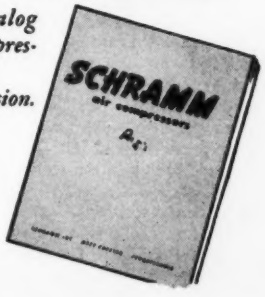


OUT OF THE WAY TO ALLOW TRAINS PASSING-BACK TO WORK IN A MINUTE **4**



MAINTENANCE OF WAY MEN SAY THE *CRAWLER'S* QUICK MOBILITY HELPS THEM TO TAMP TWICE AS MANY TIES IN A DAY

• *Get your copy of the Schramm Catalog which lists portable and stationary compressors from 20 to 420 cubic foot capacity. Address Railway Sales Division.*



SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Association News

Bridge & Building Association

All eight technical committees of the association are now working on the committee reports that are to be presented at the annual meeting to be held at the Hotel Stevens, Chicago, on September 16-18, concurrently with that of the Roadmasters' Association and a joint exhibit of the Track Supply Association and the Bridge and Building Supply Men's Association. The executive committee of the association will meet in Chicago on July 10 to review the committee reports.

Maintenance of Way Club of Chicago

The club held its annual meeting and engineering night on Monday, April 28, at Harding's restaurant at the Fair. The principal speaker was John W. Barriger, president, Chicago, Indianapolis & Louisville, who discussed the needs of the railroads for adequate fixed properties, and told of the steps, both under way and in prospect, that are being taken to rehabilitate and revitalize his railroad. Another feature of the meeting was the election of officers for the ensuing year. The new officers will be announced in the June issue.

Roadmasters' Association

The six technical committees of the association are now at work on the reports to be presented at the annual meeting to be held at Chicago on September 16-18, coincident with that of the American Railway Bridge and Building Association. At the same time there will be a joint exhibit of the Track Supply Association and the Bridge and Building Supply Men's Association.

A meeting of the Executive committee of the Roadmasters' association has been scheduled to be held at Chicago on July 14, for the primary purpose of reviewing the committee reports at that time.

Metropolitan Maintenance of Way Club

The annual meeting of the club, with election of officers, was held on Tuesday, April 1, at the Hotel Sheraton, New York. The principal speaker at the meeting was E. C. Vandenburgh, chief engineer, Chicago & North Western, who described the special trackwork that was installed jointly by the North Western and the Chicago, Milwaukee, St. Paul & Pacific at the Western Avenue crossing, Chicago. A colored moving picture showing this work in progress was shown.

In the election of officers G. B. Farlow, division engineer, Baltimore & Ohio, was elected president; L. H. Jentoft, division engineer, Erie, was elected first vice-president; George Auer, Jr., division engineer, New York Central, was elected second vice-president; and John S. Vreeland, Simmons-Boardman Publishing Corporation, was re-elected secretary-treasurer. Members elected to the Executive committee were P. O'Reilly (retiring president), track supervisor, New York, New Haven & Hartford; T. E. MacMannis, engineer maintenance of way, Central Railroad of New Jersey; J. B. Bell, engineer of track, New York, New Haven & Hartford; and J. P. Kleinkort, Ramapo-Ajax Division, American Brake Shoe Company, New York.

The annual outing of the club will be held at the Out of Bounds Country Club, Suffern, N.Y., on Tuesday, June 10.

Track Supply Association; B. & B. Supply Men's Association

At a joint meeting of the boards of direction of these two associations in Chicago on April 14, it was decided that the associations would hold a joint exhibit, on September 15-18, in conjunction with the concurrent annual meetings of the Roadmasters and Bridge & Building associations. The exhibit will be held in the Hotel Stevens under much the same arrangement as last year, and Lewis Thomas, secretary of the Track Supply Association, will again be director of exhibits. In line with the foregoing, forms for exhibit space reservations were mailed to all of the member companies of both associations late in April and the assignment of space will take place on June 5. Companies other than members of the associations which desire exhibit space should address Mr. Thomas, 59 E. Van Buren street, Chicago.

American Railway Engineering Association

On April 18 chairmen of the association's standing committees met in Chicago with President Armstrong Chinn to discuss the work of the committees for the year. Various subjects were taken up at the meeting including the procedure for organizing subcommittees and methods of conducting committee meetings. All the association's standing committees were represented. Also present were C. H. Blackman, representing the Committee on Outline of Work of the Board of Direction, and Vice-President C. H. Mottier, who was present not only in his capacity as chairman of the Committee on Publications of the Board of Direction, but also to represent J. S. McBride in his capacity as chairman of the Board Committee on Personnel.

To date five meetings of committees have been scheduled to be held during May. These include meetings of the Committee on Roadway and Ballast, to be held at the Mount Royal Hotel, Montreal, Quebec, on May 15-16; the Committee on Track to be held at Chicago on May 20; the Committee on Buildings to be held at Boston, Mass., on May 22-23; the committee on Masonry to be held at Chicago on May 5-7; and the Committee on Water Service and Sanitation to be held at Chicago on May 1.

Three committees held meetings during April, including the Committees on Records and Accounts and Iron and Steel Structures, both of which met at Washington, D. C., on April 23-24. The Committee on Economics of Railway Labor met at Chicago on April 29.

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

American Railway Engineering Association—Annual Meeting, March 16-18, 1948, Chicago.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association.

Metropolitan Maintenance of Way Club—Annual outing; Out of Bounds Country Club, Suffern, N.Y., June 10, 1947.

National Railway Appliances Association—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention.

Railway Tie Association—Annual meeting, September 23-25, 1947, Arlington hotel, Hot Springs, Ark.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association.

Supply Trade News

Personal

Glen Hoover, district manager of **The American Rolling Mill Company,** at Cleveland, Ohio, has been assigned to the direction of important accounts in Canadian territory. He will work out of the Buffalo (N.Y.) and New York offices. **Don H. Hogan,** formerly manager at Boston, Mass., has been advanced to manager of the Cleveland district.

L. E. Bartlett, of the New York sales office of the **American Lumber & Treating Co.,** has joined the company's Central District sales staff, with headquarters at Chicago, where he will be engaged in activities connected with the sale of Wolmanized, creosoted, and Minalith-flameproofed lumber throughout the mid-west, southwest, and south-central states.

T. R. Johnson, sales manager of the Keystone Asphalt Products division of the **American-Marietta Company,** has been appointed general manager, with headquarters at Chicago, succeeding **T. C. Ford,** who has retired. Mr. Johnson will continue to direct Keystone sales activities. **Lib Panichi** has been appointed production manager at Chicago Heights, Ill.

Stowell C. Wasson, manager of the **National Malleable & Steel Castings Co.'s** plants at Cicero, Ill., and Melrose Park, has been elected a director of the company, replacing **Charles H. McCrea,** deceased. Mr. Wasson, whose entire business career has been spent with National Malleable, entered the purchasing department in 1911 at Indianapolis, Ind. In 1920 he was transferred to the sales department, and in 1921 became sales manager. He was promoted to works manager in 1929, and in 1943 he was advanced to manager of both Chicago plants.

Thomas J. Lawless, formerly sales manager of the **Champion Rivet Company,** has been elected vice-president in charge of sales.

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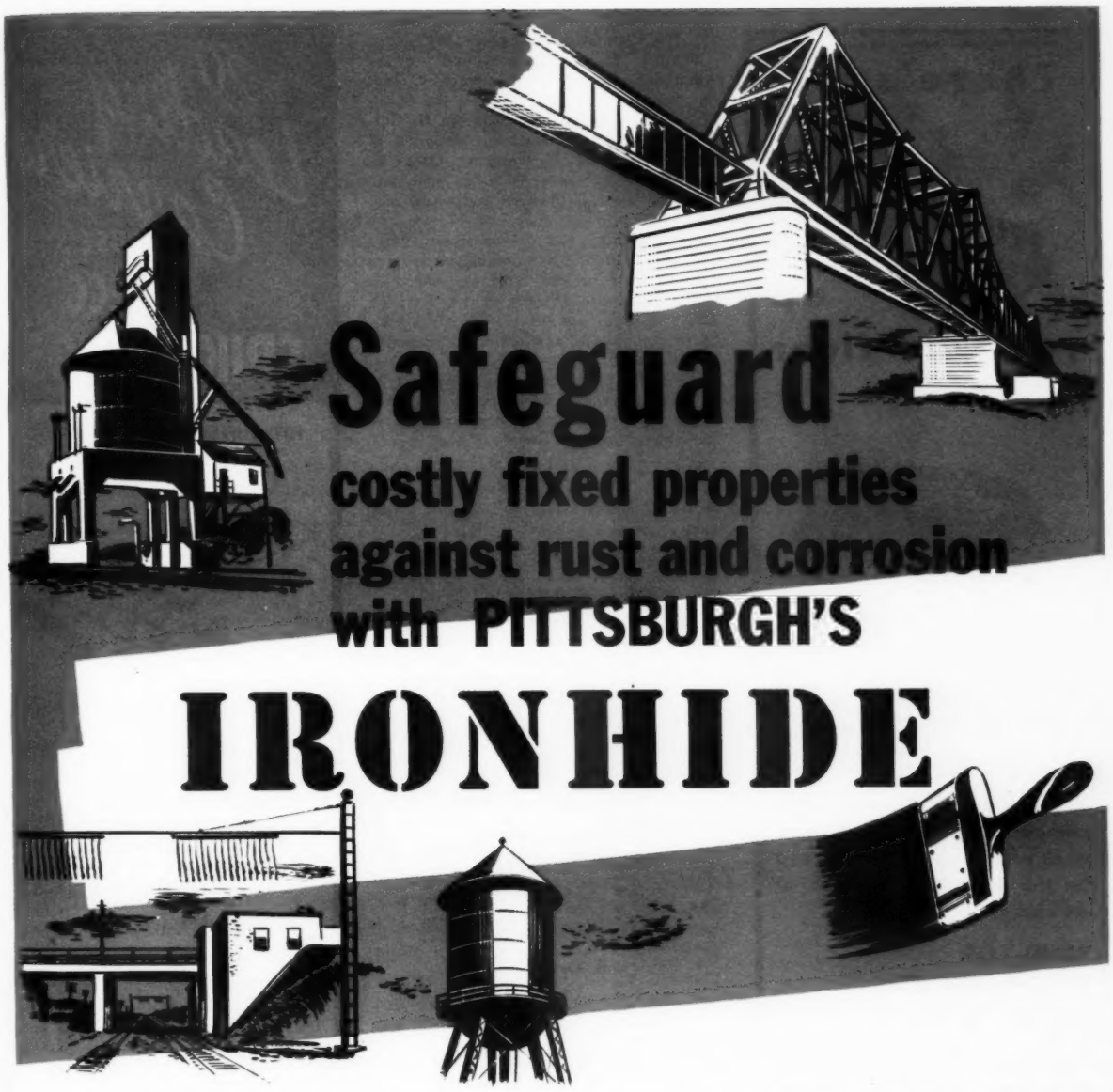

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PITTSBURGH PAINTS

PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.

RAILWAY FINISHES

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

(*Continued from page* 510)

Walter W. Walb, president of the **American Steel Dredge Company, Inc.,** has been elected chairman of the board of directors, succeeding **Mrs. F. H. Cutshall. Dean F. Cutshall** has resigned as vice-president of the company. **Oscar G. Schmieman** becomes vice-president and sales manager of dredges, hulls and fabrication. The other officers of the company are: **Glen Birt,** vice-president and plant manager; **Otto C. Scheimann,** treasurer; and **Don L. Douglass,** secretary and sales manager of the Wayne crane division. These changes are the result of the purchase of the holdings of Mrs. Cutshall and Mr. Cutshall, by means of which Mr. Walb and a group of company executives and local investors have acquired control of the parent company and its subsidiary, the American Steel Supply Corp.

E. D. Cowlin, resident manager of the Reliance division of the **Eaton Manufacturing Company,** at Massillon, Ohio, has been appointed general manager of that division, with the same headquarters. The

E. D. Cowlin

Eaton Manufacturing Company has also announced the following additional changes in executive personnel. **R. H. Daisley** has been elected vice-president and director of manufacturing, at Cleveland, Ohio. **H. J. McGinn** has been elected vice-president and director of sales. **Richard Inglis** has been elected vice-president and general counsel. All other corporate officers have been re-elected. The Wilcox-Rich division will be discontinued as such, and will be divided into the Valve division, with plants at Battle Creek, Mich., and Lawton, the Saginaw division, with plants at Saginaw, Mich., and the Pump division, with a plant at Marshall, Mich. **H. I. Dyer,** former plant manager of the Battle Creek and Lawton plants, will be general manager in charge of the Valve division. **Herbert Russell,** former plant manager of the Saginaw plant, will be general manager of the Saginaw division. **F. H. Mott, Jr.,** has been appointed general manager of the Pump division. The sales, engineering and research offices for these three new divisions will remain at Detroit, Mich.

Mr. Cowlin joined Reliance on February 1, 1924, as manager of the New York sales office. In 1930, when Reliance was

(*Continued on page* 514)

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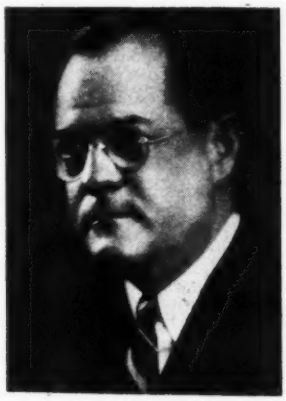
merged with the Eaton Manufacturing Company, Mr. Cowlin was appointed general sales manager of the Reliance division at Massillon. Upon the retirement of W. H. Crawford in 1945, he was named resident manager of the Reliance division. Mr. McGinn joined Reliance in 1913 as manager of the Chicago sales office, and later became general sales manager at Massillon. In 1931 he was elected a vice-president of Eaton, and a director in 1932.



H. J. McGinn

In 1941 he was appointed general manager of the Reliance division. Mr. Daisley joined Eaton in 1922 as chief inspector of the Wilcox Products Company, Saginaw. In 1936 he became general manager of the Wilcox-Rich division, and in 1937 was named president and a director of Eaton-Wilcox Rich, Ltd. Mr. Daisley was elected a vice-president of Eaton in 1938, and elevated to the board of directors in 1941. Mr. Inglis, a partner in the firm of Hauxhurst, Inglis, Sharp & Hull, Cleveland, has been associated with Eaton since 1922, when he became a director of the Torbensen Axle Company, a predecessor of the present corporation.

L. A. Hamilton, assistant manager, Seattle (Wash.) district, of the **Air Reduction Sales Company,** New York, has been appointed manager of that district, which includes practically the entire state of Washington, the northern part of Idaho, and the state of Montana. Graduated by Rice Institute in 1929, Mr. Hamilton entered the service of Air Reduction in 1930, served in the Houston (Tex.) and Los Angeles (Cal.) districts and entered the armed forces in 1941. Released from the armed forces in 1945, he returned to Air Reduction, and was appointed assistant manager of the Seattle district in May, 1946.

John A. Cuneo, whose appointment as manager of the Los Angeles (Cal.) branch of **Fairbanks, Morse & Company,** was reported in the April issue, joined the company in 1929 as a field engineer representing the export division in the West Indies and in Latin America. Later he was manager of the company's branch at Havana, Cuba, whence he was transferred to the export division at New York. Subsequently he served in the scale division at Chicago, as manager of the scale de-

(*Continued on page* 516)

(*Continued from page* 514)

partment in the company's branch at St. Louis, Mo., and as assistant manager of the export division at New York. For the past two years he has been a member of the organizing staff of Fairbanks-Morse de Mexico, Mexico City, Mex.

W. N. Foster, divisional district representative of the **Caterpillar Tractor Co.,** Peoria, Ill., has been promoted to assistant Eastern Division sales manager, succeeding **C. A. Barabe,** who will start a six-month medical leave of absence effective June 15.

S. Horace Disston, for the past eight years president of **Henry Disston & Sons, Inc.,** Philadelphia, Pa., has been elected chairman of the board. He has served the company for 48 years. **Jacob S. Disston, Jr.,** who has been a vice-president of the company for 14 years, has been elected president.

The **Independent Pneumatic Tool Company,** Chicago, has announced the opening of a technical office at Sao Paulo, Brazil. **Reuben P. Rudy,** formerly representative of the company in Brazil, has been appointed manager of the new office.

A. D. Robertson, formerly assistant manager of sales and engineering of the electrical section at the Norwood, Ohio, works of the **Allis-Chalmers Manufacturing Company,** has been appointed manager of the company's district office at Tampa, Fla., succeeding **Berrien Moore** who died recently.

R. G. LeTourneau, Inc., Peoria, Ill., has announced the following staff appointments and changes:

Robert C. Lewis as installation manager of the company. A 1932 graduate of the University of Cincinnati in civil engineering, Mr. Lewis has served ten years with the Cincinnati Highway Department and five years with the U. S. Army Engineers. He was released from the armed forces with the rank of lieutenant colonel. His department is concerned with field engineering work, the supervision of plant engineering projects, test farm, and distributor personnel sales training programs.

Keith Thompson as application engineer. Mr. Thompson has been a LeTourneau service engineer for the past seven years. His previous experience includes sixteen years with private contractors as operator, master mechanic, and job superintendent. His special duties include the coordination of field engineering with equipment service functions, recommendations for the effective use of equipment, and assistance in training programs in the mechanics of equipment operation.

O. A. Williams as western sales manager, with headquarters at Stockton, Cal. Formerly a LeTourneau district representative and more recently eastern sales manager, Mr. Williams now supervises the activities of LeTourneau sales and service representatives in seven western states, and assists distributors.

E. M. Ferguson as eastern sales manager, with headquarters at 1026 17th street, N.W., 412-413 Defense Building, Washington, D. C. With LeTourneau for more than eight years as district representative, assistant western sales manager, and, recently, as western sales manager, Mr. Ferguson coordinates the activities of LeTourneau sales, service representatives, and distributors in twenty-three eastern states.

C. D. Fey, formerly western industrial sales representative, as industrial sales representative for the entire country, with headquarters at Peoria, where he assists distributors who specialize in the sale of equipment to railroads and heavy industries. The company's central sales office has been moved from Peoria to Suite 616, City Bank Building, 18th & Grand streets, Kansas City, Mo., where **W. B. Worden,** central sales manager, supervises sales and service activities in eighteen mid-western states.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 465)

Kalamazoo Motor Cars—The Kalamazoo Manufacturing Company has released a four-page bulletin dealing with three motor cars produced by the company—the 27A, the 27AW, and the 38B, the first two of which have a capacity of ten men, and the third a capacity of 14 men. The bulletin, which is well illustrated in color, first discusses the salient features of the cars and certain special details of construction. Complete specifications of the three models are included, as well as power-torque diagrams showing their performance.

Mistakes in Drainage — and What Makes a Subdrain—An eight-page booklet with this title, containing a reprint of an article from The Highway Magazine by H. E. Cotton, drainage engineer for the Armco Drainage & Metal Products, Inc., Middletown, Ohio, is being distributed by that company. The article is divided into two parts; the first directs attention to several improper drainage practices and offers suggestions for effecting good drainage; the second part is a treatise setting forth facts learned in recent years about soil mechanics in connection with sub-drainage and offering suggestions for the preparation of trench bottoms, proper backfilling, and the design of infiltration areas in drain pipes.

Ballast Plow and Track Dresser—The Kershaw Company, Inc., has published a four-page illustrated folder dealing chiefly with the construction and application of the company's ballast plow and track dresser. The text is supported by diagrams and photographs of the machine in operation, and specifications are included. Other Kershaw products are also listed.

Rust-Oleum Railroad Applications—This is the title of a 20-page catalog published by the Rust-Oleum Corporation, Evanston, Ill., in which are described the applications of this rust-preventive material in the railroad field. The catalog includes illustrations of bridges, buildings, signal equipment and rolling stock, with captions showing the proper Rust-Oleum compound to be applied to each.

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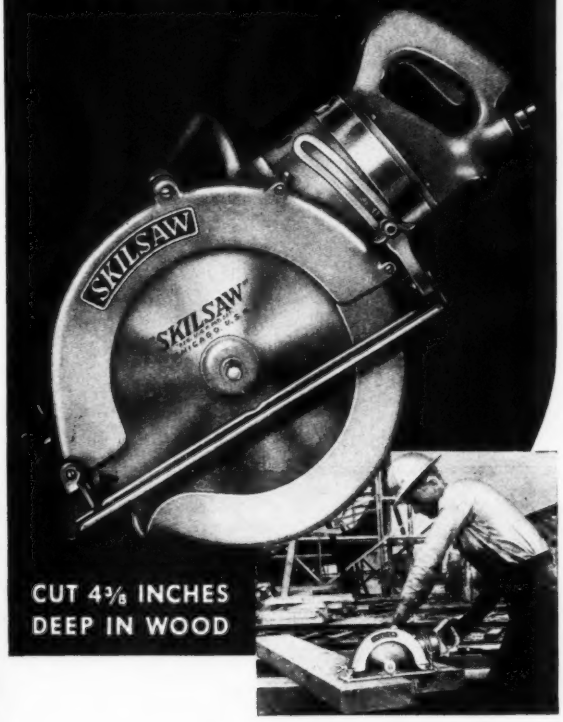

• Pneumatic SKILSAW operates efficiently anywhere you have an 80 to 100 lb. air pressure line . . . cuts fast through flooring and bracing for freight cars . . . speeds bridge and trestle building, station and warehouse repairs. Outstanding safety is provided by leak-proof poppet-type throttle valve which cuts air off instantly when closed. Positive safety lock prevents accidental starting. Telescoping guard shields blade. Call your distributor today for a demonstration!

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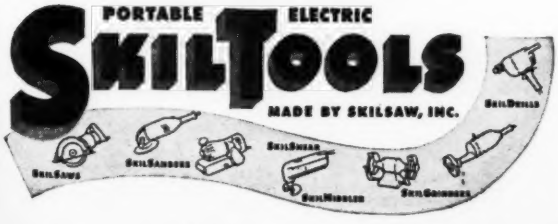

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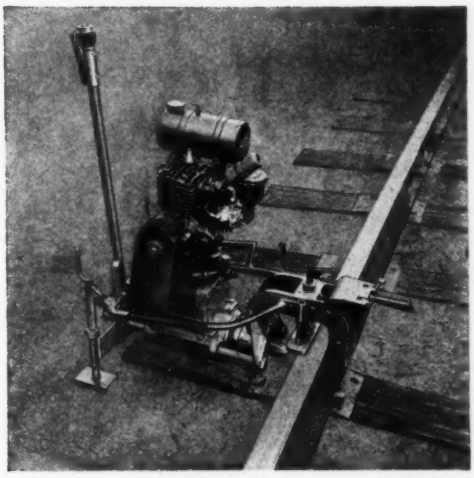

Model P-34-A Power Track Drill

new RTW *power track drill*

Modern in design, up-to-date in construction, this new track drill embodies many features that help speed rail maintenance at materially reduced costs.

The P-34-A consists of a 1½ hp air-cooled gasoline engine, with V-Belt drive from the engine shaft to a counter shaft which drives drill through a gear reduction assembly.

Gear reduction housing is cast aluminum to reduce weight. Steel frame, of lasting strength and durability, is designed to provide fast, accurate leveling with rail and irregular or uneven ground. There is also ample adjustment to various rail sizes.

For easy operation, lateral travel for feeding drill is controlled by a ratchet gear and rack. The chuck will take a flat beaded bit up to 1½ inches and will drill a hole in less than a minute.

Belt is adjusted by raising or lowering motor on frame. Guards are installed for protection around frame.

Well balanced, light weight, portable, quick to attach and remove from rail, the P-34-A Power Track Drill is designed for durability, easy handling and to insure efficient rail maintenance.

Further information on the P-34-A and other RTW machines sent on request.

Railway Trackwork Co.
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GRAPPLE

Let UNIT Help You Reduce Material Handling Costs!

Rugged, easy-to-operate UNIT Cranes speed up the material handling job. UNIT combines LIFT ability, plus stability . . . is quickly convertible to magnet, grapple or clamshell. Crawler type or mobile units available. Famous UNIT cast gear case completely encloses and oil-seals all working parts. Other exclusive features include: Drop-forged steel gears . . . Splined shafts . . . Disc type clutches . . . FULL VISION CAB. Low initial cost . . . low upkeep. Assures maximum yard profits.

UNIT 1020
Husky, crawler-type crane equipped with Magnet attachment. 10 ton capacity. Fully convertible.

CLAMSHELL

CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY.

½ and ¾ Yard Excavators
5 to 10 Ton Cranes
Fully Convertible.

UNIT CRANE & SHOVEL CORP.

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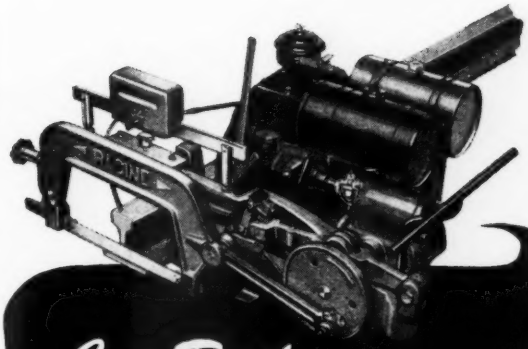


Cut Rail . . .
RIGHT ON THE TRACK
with . . .

RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

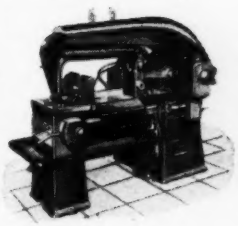
SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
5. Removing split, worn and battered rail ends.
6. Cutting out sections of wheel burned rails and fissures.

Models are available with gas engines, compressed air or electric motors. Write for complete catalog No. 58A. Address RACINE TOOL AND MACHINE CO., 1738 State St., Racine, Wisconsin.

RACINE HEAVY DUTY METAL SAWS FOR RAILROAD SHOPS

Cut axle shafts, boiler pipe, channels, angles and beams quickly and accurately. Models are available in all price ranges for either high speed production metal cutting or general all around shop work. Capacities 6" x 6" to 20" x 20". Ask for general catalog No. 12 giving description of complete Racine Saw line.



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RACINE

OHIO STATE CAPITOL BLDG., COLUMBUS

LONG LIFE QUALITY

Pleases Ohio Cities and Industries

Ohio, famed state of thousands of great industries and many prosperous and progressive cities now has in operation over 650 Layne high efficiency Well Water Systems. These Vertical Turbine systems are distinguished by their outstanding engineering features, extra-ordinarily high quality and absolute dependability in providing years and years of service.

Layne Well Water Systems are world famous for low operation cost. Furthermore they are so sturdily built and correctly installed that little or no upkeep expense is necessary.

For nearly 70 years Layne has pioneered in Well Water Systems and Vertical Turbine Pumps. No other make, in all the world compares with their high standards of perfection.

For further facts, catalogs, bulletins, etc., address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tennessee.

PUMPS For

Wells—Lakes—Rivers—Reservoirs—Irrigation Projects—are obtainable in sizes from 40 to 16,000 gallons per minute, powered by electric motor, V-Belt or angle gear drives. Write for Pump Catalog.

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WELL WATER SYSTEMS

VERTICAL TURBINE PUMPS

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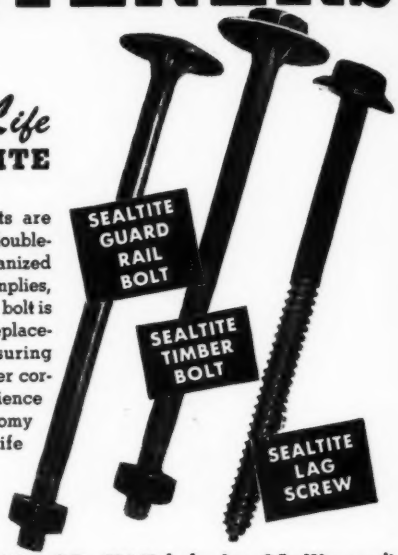

Double-Life
SEALED-TITE IN ZINC

All Sealtite products are offered in our thick, double-life, hot dipped galvanized finish. As the name implies, the service life of the bolt is lengthened saving replacement costs and assuring freedom from fastener corrosion. Actual experience tests prove the economy of using Double-Life Sealtite Products.

LEWIS BOLT & NUT CO., 504 Malcolm Ave. S.E., Minneapolis

Designed and Engineered
FOR RAILWAY USE

Wanted!

RELAYING RAILS

all sizes and sections,
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ALPHABETICAL INDEX TO ADVERTISERS, MAY, 1947

BLUE BRUTE TRACK TEAMS RACE AHEAD

Whenever maintenance crews are under *real* pressure you'll find Blue Brute Teams setting the pace.

Speed and stamina stand out in every Blue Brute. Take the new, streamlined Hand-I-Air Compressor . . . it's so light two men handle it — yet it has the guts of a heavyweight — delivers 60 cubic feet of low-cost air per minute with the smooth, effortless power of a champion. Light, tight Feather* Valves efficiently control the flow of power from this two-wheeled tornado . . . you get a Blue Brute that "breathes" like a well-conditioned athlete. No other compressor so small stays on the job so long without "time out" to catch its breath!

The four WTT-7 Tie Tampers with leakproof throttles are lean, tough, fast . . . weigh only 42 pounds each . . . are perfectly matched to the compressor for efficiency that adds up to more finished surfacing per day.

Other Blue Brutes . . . grouters . . . contractors' pumps . . . portable cement mixers . . . rock drills and pavement breakers . . . all team up to get more work done at less cost. Investigate them now . . . you'll find *there's more worth in Worthington-Ransome.*

H7-8

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Massachusetts

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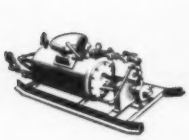
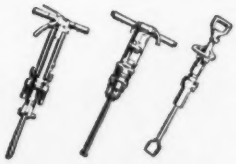


Pneumatic Grouter

Portable Concrete Mixer

Self Priming Centrifugal Pump



Hand Held Air Tools

Railcar Compressor

FOR EVERY CONSTRUCTION AND MAINTENANCE JOB